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Response Factors of VOC Calibrated with Methane for Selected Organic Chemicals

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16. ABSTRACT The report summarizes results of a laboratory study of the sensitivity of portable volatile organic compound (VOC) analyzers to a variety of organic chemicals. This type of analyzer is commonly used in monitoring for fugitive emissions: most previous work involved Century Systems OVA-108 or -128, or the J.W. Bacharach TLV Sniffer. The OVA-108 and TLV were used for testing in this study. The sensitivity of the analyzer was characterized by a response factor, defined as the ratio of the actual chemical concentration to the observed instrument response. Bag samples of known concentration were prepared by introducing a measured weight (or volume) of subject chemical into a Tedlar bag containing a known volume of hydrocarbon-free air. Such response factors were determined for 168 organic chemicals at a minimum of three concentrations. These data points were fitted to a predictive model to allow estimation of the instrument response at any concentration. Coefficients of the predictive equation for each chemical, as well as the fitted response factor at an actual concentration of 10,000 parts per million by volume (ppmv), are presented.

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by

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SECTION 1

INTRODUCTION

This report presents the results of a laboratory study of the sensitivity of two types of portable hydrocarbon detectors to a variety of organic chemicals. This work was funded by the EPA as part of contract number 68-02-3171, Task 4. This introductory section will briefly discuss the background, objectives, and procedures used in the project.

The study of fugitive Volatile Organic Compound (VOC) emissions has rapidly gained emphasis over the past several years. Several research efforts designed to measure fugitive emission levels and to assess the effectiveness of proposed control schemes are in various stages of completion. The development of regulations to control fugitive emissions has begun at both the state and Federal level.

As a result of this research, a roughly quantitative method for leak detection has been developed which is commonly called "screening". The screening process is simply the measurement of the VOC concentration at a point close to the potential leak site (valve stem, pump seal, etc.). The measurement is made with a portable hydrocarbon detector. While many instruments could potentially be used for this service, the bulk of the existing data has been taken using either the J. W. Bacharach "TLV Sniffer" or the Century Systems "OVA-108".

While these instruments will respond to almost any combustible material, they exhibit different sensitivities to various types of hydrocarbons and substituted organic chemicals. The "response factor" is a correction factor which quantifies these differences in sensitivity.

The primary objective of this work is to experimentally determine the response factors for a large number of commonly encountered chemical species. Such response factors are presented here for both the OVA and the TLV. Two instruments of each type (one old and one new) were tested to check for instrument-to-instrument variations. Each chemical was tested at several concentrations to assess variations in the response factor over the range of interest.

The experimental determination of a response factor simply requires reading the observed concentration on the instrument when testing a gas sample of known concentration. Such standard gas samples were prepared by introducing a measured quantity of the subject chemical into a Tedlar bag containing a measured quantity of pure air. The response factor was then calculated by:

$$\text{Response Factor (RF)} = \frac{\text{Actual Concentration}}{\text{Observed Concentration.}}$$

SECTION 2

CONCLUSIONS

This report presents data on the sensitivity of two types of portable hydrocarbon analyzers, the "OVA-108" and the "TLV Sniffer", to 168 different chemical compounds. This sensitivity is expressed as a response factor for each chemical based on a calibration to methane. The response factor is defined as the ratio of the actual concentration to the observed concentration (or response).

2.1 SUMMARY OF RESULTS

One of the major conclusions of this work is that response factors vary with concentration, which makes it difficult to characterize a given chemical's response with a single number. Attempts to characterize the entire concentration range with a mean value (or other similar statistical parameters) have proved unsuccessful.

The estimated response factor at an actual concentration of 10,000 ppmv has been chosen as the most desirable single point mode of expression. Table 2-1 presents these estimated response factors for all 168 chemicals on both types of instruments and the 95 percent confidence intervals which bound the estimates. Figures 2-1 and 2-2 are graphical representations of the same data for the OVA and TLV, respectively.

The choice of an estimated response factor at 10,000 ppmv actual concentration is based on the need to provide meaningful input to the regulation and control of fugitive emissions from the SOCMI. The Background Information Document on fugitives from SOCMI[1] recommends an action level of 10,000 ppmv

TABLE 2-1

FITTED RESPONSE FACTORS
WITH 95 % CONFIDENCE INTERVALS

ESTIMATED AT 10,000 PPMV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	OVA		TLV	
			RESPONSE FACTOR	CONFIDENCE INTERVALS	RESPONSE FACTOR	CONFIDENCE INTERVALS
70	ACETIC ACID	LL	1.83	(1.17- 2.87)	5.70	(4.16- 7.81)
80	ACETIC ANHYDRIDE	LL	1.36	(1.12- 1.65)	2.89	(1.62- 5.14)
90	ACETONE	LL	0.79	(0.53- 1.19)	1.22	(0.81- 1.83)
100	ACETONE CYANOHYDRIN	HL	3.42	(0.70- 16.83)	7.84	(1.40- 43.78)
110	ACETONITRILE	LL	0.94	(0.85- 1.05)	1.17	(0.96- 1.42)
120	ACETOPHENONE	HL	10.98	(5.56- 21.68)	54.86	(38.35- 78.48)
125	ACETYL CHLORIDE	LL	1.99	(1.76- 2.26)	2.59	(1.81- 3.71)
-	ACETYL-1-PROPANOL,3-	LL	10.87	(6.58- 17.95)	25.81	(13.70- 48.63)
130	ACETYLENE	G	0.37	(0.32- 0.43)	11.95	(10.41- 13.73)
160	ACRYLIC ACID	LL	4.65	(3.85- 5.61)	36.95	(5.34-255.69)
170	ACRYLONITRILE	LL	0.96	(0.79- 1.17)	2.70	(0.44- 16.36)
-	ALLENE	G	0.55	(0.49- 0.61)	5.78	(5.36- 6.24)
200	ALLYL ALCOHOL	LL	0.94	(0.69- 1.30)	.	(. - .)
250	AMYL ALCOHOL,N-	HL	0.69	(0.47- 1.00)	1.78	(1.19- 2.66)
2855	AMYLENE	LL	0.31	(0.19- 0.51)	1.03	(0.46- 2.32)
330	ANISOLE	LL	0.92	(0.64- 1.32)	2.69	(1.69- 4.27)
360	BENZALDEHYDE	HL	2.36	(1.52- 3.68)	6.30	(5.77- 6.88)
380	BENZENE	LL	0.21	(0.19- 0.24)	1.07	(0.97- 1.19)
450	BENZONITRILE	HL	2.24	(1.18- 4.24)	9.13	(2.82- 29.62)
490	BENZOYL CHLORIDE	HL	6.40	(3.20- 12.80)	6.60	(3.41- 12.79)
530	BENZYL CHLORIDE	HL	4.23	(2.74- 6.52)	4.87	(2.50- 9.48)
570	BROMOBENZENE	LL	0.36	(0.28- 0.46)	1.16	(0.69- 1.94)
590	BUTADIENE,1,3-	G	0.37	(0.34- 0.42)	6.00	(5.64- 6.39)
-	BUTANE,N-	G	0.38	(0.31- 0.46)	0.68	(0.61- 0.75)
640	BUTANOL,N	LL	1.43	(0.66- 3.13)	2.80	(1.49- 5.27)
650	BUTANOL,SEC-	LL	0.70	(0.63- 0.78)	1.26	(1.00- 1.57)
660	BUTANOL,TERT	S	0.44	(0.26- 0.74)	2.19	(1.54- 3.11)
592	BUTENE,1-	G	0.51	(0.45- 0.58)	2.97	(2.73- 3.24)
600	BUTYL ACETATE,N-	LL	0.60	(0.46- 0.78)	1.30	(1.18- 1.42)
630	BUTYL ACRYLATE,N-	LL	0.64	(0.56- 0.74)	1.98	(0.89- 4.43)
-	BUTYL ETHER,N	LL	2.70	(1.95- 3.73)	2.66	(1.42- 4.95)

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 2-1 (continued)

FITTED RESPONSE FACTORS
WITH 95 % CONFIDENCE INTERVALS

ESTIMATED AT 10,000 PPMV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	OVA		TLV	
			RESPONSE FACTOR	CONFIDENCE INTERVALS	RESPONSE FACTOR	CONFIDENCE INTERVALS
-	BUTYL ETHER,SEC	LL	0.26	(0.11- 0.60)	1.13	(0.78- 1.64)
670	BUTYLAMINE,N-	LL	0.63	(0.43- 0.92)	1.91	(1.38- 2.65)
680	BUTYLAMINE,SEC-	LL	0.67	(0.53- 0.84)	1.50	(1.26- 1.79)
690	BUTYLAMINE,TERT-	LL	0.58	(0.52- 0.65)	1.80	(1.53- 2.11)
-	BUTYLBENZENE,TERT-	HL	1.27	(0.94- 1.73)	6.42	(1.82- 22.67)
750	BUTYRALDEHYDE N-	LL	1.39	(1.12- 1.71)	1.89	(1.60- 2.23)
760	BUTYRIC ACID	HL	0.74	(0.22- 2.52)	4.58	(2.39- 8.78)
780	BUTYRONITRILE	LL	0.46	(0.31- 0.70)	1.33	(0.44- 3.99)
790	CARBON DISULFIDE	LL	571.92	(279.65-1169.7)	2.96	(2.62- 3.34)
810	CARBON TETRACHLORIDE	LL	21.28	(10.95- 41.36)	30.52	(8.96-103.88)
830	CHLOROACETALDEHYDE	LL	13.40	(9.85- 18.24)	5.07	(3.65- 7.06)
890	CHLOROBENZENE	LL	0.36	(0.28- 0.48)	0.88	(0.77- 1.00)
1740	CHLOROETHANE	G	0.67	(0.02- 22.54)	2.16	(0.31- 14.95)
930	CHLOROFORM	LL	4.48	(3.60- 5.56)	8.77	(5.65- 13.64)
960	CHLOROPHENOL,O-	HL	3.33	(1.88- 5.92)	5.87	(2.45- 14.06)
-	CHLOROPROPENE, 1-	LL	0.59	(0.53- 0.66)	0.86	(0.64- 1.15)
210	CHLOROPROPENE, 3-	LL	0.75	(0.65- 0.87)	1.24	(1.09- 1.41)
970	CHLOROTOLUENE,M-	LL	0.43	(0.39- 0.47)	0.92	(0.70- 1.21)
980	CHLOROTOLUENE,O-	LL	0.45	(0.38- 0.54)	1.05	(0.70- 1.58)
990	CHLOROTOLUENE,P-	LL	0.52	(0.47- 0.58)	1.15	(0.62- 2.12)
1010	CRESOL,O-	S	0.95	(0.59- 1.52)	3.98	(0.22- 72.91)
1040	CROTONALDEHYDE	LL	1.32	(0.78- 2.23)	8.54	(2.33- 31.36)
1060	CUMENE	LL	1.92	(1.13- 3.28)	12.49	(5.62- 27.74)
1120	CYCLOHEXANE	LL	0.36	(0.26- 0.50)	0.72	(0.63- 0.82)
1130	CYCLOHEXANOL	HL	0.82	(0.58- 1.17)	4.92	(1.18- 20.48)
1140	CYCLOHEXANONE	LL	1.50	(1.01- 2.22)	3.99	(1.79- 8.91)
1150	CYCLOHEXENE	LL	0.40	(0.32- 0.51)	1.84	(1.65- 2.05)
1160	CYCLOHEXYLAMINE	LL	0.47	(0.28- 0.79)	1.38	(1.31- 1.45)
-	DECANE	HL	0.00	(0.00- 3.31)	0.20	(0.00- 31.01)
1190	DIACETONE ALCOHOL	HL	1.53	(1.01- 2.31)	0.98	(0.29- 3.36)
-	DIACETYL	LL	1.61	(1.31- 1.99)	2.81	(2.15- 3.67)

* ORGANIC CHEMICAL PRODUCERS DATA BASE

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 2-1 (continued)

FITTED RESPONSE FACTORS
WITH 95 % CONFIDENCE INTERVALS

ESTIMATED AT 10,000 PPMV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	OVA		TLV	
			RESPONSE FACTOR	CONFIDENCE INTERVALS	RESPONSE FACTOR	CONFIDENCE INTERVALS
-	DICHLORO-1-PROPANOL,2,3-	LL	61.51	(30.13-125.55)	34.34	(23.80- 49.55)
1270	DICHLORO-1-PROPENE,2,3-	LL	0.70	(0.47- 1.05)	1.62	(1.22- 2.14)
-	DICHLORO-2-PROPANOL,1,3-	LL	29.34	(17.42- 49.40)	18.63	(12.95- 26.82)
1215	DICHLOROBENZENE,M-	HL	0.66	(0.56- 0.78)	1.89	(1.37- 2.60)
1216	DICHLOROBENZENE,O-	HL	0.70	(0.48- 1.03)	1.22	(0.80- 1.86)
-	DICHLOROETHANE,1,1-	LL	0.77	(0.60- 0.98)	1.80	(1.58- 2.06)
1244	DICHLOROETHANE,1,2-	LL	0.95	(0.77- 1.18)	2.08	(1.73- 2.51)
1235	DICHLOROETHYLENE,CIS1,2-	LL	1.31	(1.08- 1.58)	1.93	(1.02- 3.66)
1236	DICHLOROETHYLENE,TRANS1,2	LL	1.13	(0.99- 1.30)	1.86	(0.55- 6.29)
2620	DICHLOROMETHANE	LL	2.26	(1.94- 2.64)	3.63	(2.72- 4.84)
3110	DICHLOROPROPANE,1,2-	LL	1.03	(0.82- 1.29)	1.80	(1.12- 2.89)
1440	DIISOBUTYLENE	LL	0.24	(0.17- 0.35)	1.39	(0.97- 2.01)
-	DIISOPROPYL BENZENE,1,3-	LL	9.43	(3.68- 24.18)	24.96	(6.07-102.67)
1870	DIMETHOXY ETHANE,1,2-	LL	1.28	(0.57- 2.90)	1.43	(1.16- 1.75)
1490	DIMETHYLFORMAMIDE,N,N-	LL	3.89	(3.11- 4.85)	2.95	(2.86- 3.03)
1495	DIMETHYLHYDRAZINE 1,1-	LL	1.04	(0.71- 1.52)	2.74	(1.61- 4.67)
-	DIMETHYLSTYRENE,2,4-	LL	37.09	(25.75- 53.42)	78.06	(38.51-158.23)
1520	DIMETHYLSULFOXIDE	HL	0.00	(0.00-4300.8)	4.88	(1.41- 16.92)
1480	DIOXANE	LL	1.58	(1.10- 2.28)	1.23	(1.07- 1.41)
1650	EPICHLOROHYDRIN	LL	1.72	(1.61- 1.83)	2.02	(1.84- 2.22)
-	ETHANE	G	0.57	(0.26- 1.26)	0.73	(0.21- 2.52)
1660	ETHANOL	LL	2.04	(1.83- 2.28)	.	(. - .)
1910	ETHOXY ETHANOL,2-	LL	1.68	(1.38- 2.06)	1.61	(1.42- 1.84)
1670	ETHYL ACETATE	LL	0.84	(0.74- 0.94)	1.37	(1.08- 1.74)
1680	ETHYL ACETOACETATE	HL	3.02	(1.98- 4.62)	3.13	(2.71- 3.63)
1690	ETHYL ACRYLATE	LL	0.72	(0.55- 0.93)	.	(. - .)
1750	ETHYL CHLOROACETATE	LL	1.97	(1.76- 2.21)	1.47	(0.97- 2.23)
1990	ETHYL ETHER	LL	0.97	(0.73- 1.28)	1.11	(1.01- 1.23)
1710	ETHYLBENZENE	LL	0.70	(0.45- 1.09)	3.14	(1.43- 6.92)
1770	ETHYLENE	G	0.52	(0.39- 0.68)	1.49	(1.27- 1.74)
1980	ETHYLENE OXIDE	G	2.72	(2.31- 3.20)	2.43	(1.92- 3.07)

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS: LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 2-1 (continued)

FITTED RESPONSE FACTORS
WITH 95 % CONFIDENCE INTERVALS

ESTIMATED AT 10,000 PPMV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	OVA		TLV	
			RESPONSE FACTOR	CONFIDENCE INTERVALS	RESPONSE FACTOR	CONFIDENCE INTERVALS
1800	ETHYLENEDIAMINE	LL	1.78	(1.39- 2.28)	2.46	(1.83- 3.32)
2060	FORMIC ACID	LL	34.87	(29.00- 41.94)	33.21	(16.78- 65.73)
1221	FREON 12	G	9.65	(6.99- 13.33)	11.83	(3.63- 38.59)
2073	FURFURAL	HL	7.96	(3.69- 17.15)	10.01	(9.72- 10.31)
2105	GLYCIDOL	LL	8.42	(5.14- 13.81)	5.23	(2.68- 10.22)
-	HEPTANE	LL	0.30	(0.12- 0.75)	0.75	(0.56- 1.00)
-	HEXANE,N-	LL	0.31	(0.26- 0.36)	0.72	(0.65- 0.79)
-	HEXENE,1-	LL	0.39	(0.26- 0.58)	2.92	(0.86- 9.89)
-	HYDROXYACETONE	LL	8.70	(6.51- 11.64)	9.34	(6.21- 14.06)
2200	ISOBUTANE	G	0.30	(0.09- 0.95)	0.61	(0.44- 0.86)
2350	ISOBUTYLENE	G	2.42	(1.01- 5.84)	6.33	(0.09-460.41)
2360	ISOPRENE	LL	0.48	(0.32- 0.72)	.	(. - .)
2370	ISOPROPANOL	LL	0.90	(0.68- 1.18)	1.35	(0.98- 1.86)
2390	ISOPROPYL ACETATE	LL	0.68	(0.58- 0.80)	1.25	(1.11- 1.40)
-	ISOPROPYL CHLORIDE	LL	0.62	(0.52- 0.73)	0.99	(0.81- 1.19)
2450	ISOVALERALDEHYDE	LL	0.55	(0.45- 0.66)	2.04	(1.19- 3.51)
-	MESITYL OXIDE	LL	1.12	(0.94- 1.33)	3.12	(1.68- 5.79)
2460	METHACROLEIN	LL	1.27	(0.91- 1.77)	3.10	(1.65- 5.83)
2500	METHACRYLIC ACID	HL	0.71	(0.06- 7.84)	6.61	(0.37-116.80)
1930	METHANOL	LL	5.69	(4.96- 6.52)	1.88	(1.62- 2.18)
2510	METHOXY-ETHANOL,2-	LL	2.70	(1.99- 3.67)	2.19	(1.85- 2.60)
-	METHYL ACETATE	LL	1.80	(1.55- 2.08)	1.76	(1.47- 2.12)
2560	METHYL ACETYLENE	G	0.53	(0.50- 0.57)	3.92	(3.59- 4.29)
2640	METHYL CHLORIDE	G	1.75	(1.44- 2.14)	2.45	(1.62- 3.73)
2645	METHYL ETHYL KETONE	LL	0.57	(0.40- 0.81)	1.12	(0.93- 1.35)
2665	METHYL FORMATE	LL	3.47	(2.87- 4.19)	1.93	(1.76- 2.11)
2650	METHYL METHACRYLATE	LL	0.99	(0.89- 1.10)	2.36	(1.54- 3.62)
2660	METHYL-2-PENTANOL,4-	LL	1.70	(1.33- 2.17)	1.94	(1.46- 2.58)
-	METHYL-2-PENTANONE,4-	LL	0.49	(0.38- 0.64)	1.54	(1.22- 1.94)
2550	METHYL-2,4-PENTANEDIOL,2-	LL	96.34	(72.63-127.80)	67.07	(36.31-123.87)
	METHYL-3-BUTYN-2-OL,2	LL	0.51	(0.32- 0.79)	.	(. - .)

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 2-1 (continued)

FITTED RESPONSE FACTORS
WITH 95 % CONFIDENCE INTERVALS

ESTIMATED AT 10,000 PPMV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	OVA		TLV	
			RESPONSE FACTOR	CONFIDENCE INTERVALS	RESPONSE FACTOR	CONFIDENCE INTERVALS
-	METHYLAL	LL	1.46	(1.09- 1.96)	1.41	(1.23- 1.62)
2540	METHYLANILINE,N-	HL	4.13	(3.75- 4.54)	5.25	(0.99- 27.84)
2570	METHYLCYCLOHEXANE	LL	0.38	(0.12- 1.16)	0.85	(0.67- 1.07)
-	METHYLCYCLOHEXENE,1-	LL	0.33	(0.24- 0.45)	2.22	(1.70- 2.91)
2670	METHYLPENTYNOL	LL	1.17	(0.71- 1.92)	2.82	(1.92- 4.14)
2690	METHYLSTYRENE, A-	LL	10.24	(8.30- 12.63)	31.46	(16.08- 61.53)
1660	MONOETHANOLAMINE	LL	28.04	(6.39-123.04)	25.83	(11.82- 56.44)
2700	MORPHOLINE	LL	0.92	(0.64- 1.32)	1.93	(0.36- 10.40)
2770	NITROBENZENE	HL	29.77	(3.92-226.03)	40.61	(4.68-352.68)
2790	NITROETHANE	LL	1.40	(1.23- 1.59)	2.84	(1.60- 4.04)
2791	NITROMETHANE	LL	3.32	(3.03- 3.64)	5.25	(2.32- 11.86)
2795	NITROPROPANE	LL	1.06	(0.79- 1.42)	1.77	(1.22- 2.57)
-	NONANE-N	LL	1.62	(0.93- 2.81)	5.54	(2.82- 10.89)
-	OCTANE	LL	1.04	(0.88- 1.22)	2.06	(1.76- 2.46)
2851	PENTANE	LL	0.42	(0.30- 0.58)	0.62	(0.55- 0.69)
2910	PHENOL	S	11.75	(7.55 18.29)	12.01	(3.57- 40.43)
-	PHENYL-2-PROPANOL,2-	LL	89.56	(69.84-114.83)	76.57	(46.38-126.42)
2973	PICOLINE,2-	LL	0.34	(0.27- 0.41)	1.17	(1.10- 1.25)
-	PROPANE	G	0.88	(0.10- 7.54)	0.63	(0.24- 1.64)
3063	PROPIONALDEHYDE	LL	1.19	(1.02- 1.39)	1.65	(1.16- 2.36)
3066	PROPIONIC ACID	LL	1.34	(1.06- 1.69)	3.51	(0.90- 13.62)
3070	PROPYL ALCOHOL	LL	0.91	(0.72- 1.15)	1.55	(1.41- 1.71)
-	PROPYLBENZENE,N-	LL	0.44	(0.37- 0.53)	5.97	(0.33-108.71)
3090	PROPYLENE	G	0.78	(0.39- 1.57)	2.80	(0.96- 8.20)
3120	PROPYLENE OXIDE	LL	0.80	(0.69- 0.93)	1.15	(0.68- 1.93)
3130	PYRIDINE	LL	0.41	(0.33- 0.51)	1.17	(1.03- 1.32)
3230	STYRENE	LL	4.16	(3.68- 4.71)	36.83	(7.32-185.28)
3290	TETRACHLOROETHANE,1,1,1,2	LL	3.00	(1.27- 7.07)	6.52	(3.82- 11.11)
3291	TETRACHLOROETHANE,1,1,2,2	LL	6.06	(4.78- 7.68)	14.14	(8.51- 23.51)
2860	TETRACHLOROETHYLENE	LL	3.16	(1.92- 5.21)	11.46	(8.64- 15.20)
3349	TOLUENE	LL	0.33	(0.29- 0.38)	2.32	(0.79- 6.82)

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** GAS = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 2-1 (continued)

FITTED RESPONSE FACTORS
WITH 95 % CONFIDENCE INTERVALS

ESTIMATED AT 10,000 PPMV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	OVA		TLV	
			RESPONSE FACTOR	CONFIDENCE INTERVALS	RESPONSE FACTOR	CONFIDENCE INTERVALS
3393	TRICHLOROBENZENE,1,2,4-	HL	1.35	(0.13- 14.00)	0.39	(0.10- 1.57)
3395	TRICHLOROETHANE,1,1,1-	LL	0.79	(0.70- 0.89)	2.41	(1.98- 2.96)
3400	TRICHLOROETHANE,1,1,2-	LL	1.26	(1.08- 1.47)	3.68	(3.05- 4.43)
3410	TRICHLOROETHYLENE	LL	0.94	(0.81- 1.08)	3.35	(2.68- 4.19)
3420	TRICHLOROPROPANE,1,2,3-	LL	0.95	(0.54- 1.69)	2.23	(1.47- 3.40)
3450	TRIETHYLAMINE	LL	0.46	(0.32- 0.67)	1.41	(1.03- 1.92)
3510	VINYL ACETATE	LL	1.31	(0.97- 1.76)	3.99	(1.49- 10.69)
3520	VINYL CHLORIDE	G	0.65	(0.50- 0.84)	1.10	(0.79- 1.55)
-	VINYL PROPIONATE	LL	0.94	(0.40- 2.23)	0.70	(0.02- 22.87)
3530	VINYLIDENE CHLORIDE	LL	1.15	(0.86- 1.54)	2.38	(1.95- 2.90)
3570	XYLENE, P-	LL	2.27	(1.87- 2.76)	5.35	(3.34- 8.58)
3550	XYLENE,M-	LL	0.30	(0.25- 0.37)	3.56	(0.93- 13.64)
3560	XYLENE,O-	LL	0.36	(0.16- 0.77)	1.40	(0.72- 2.70)

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

Figure 2-1

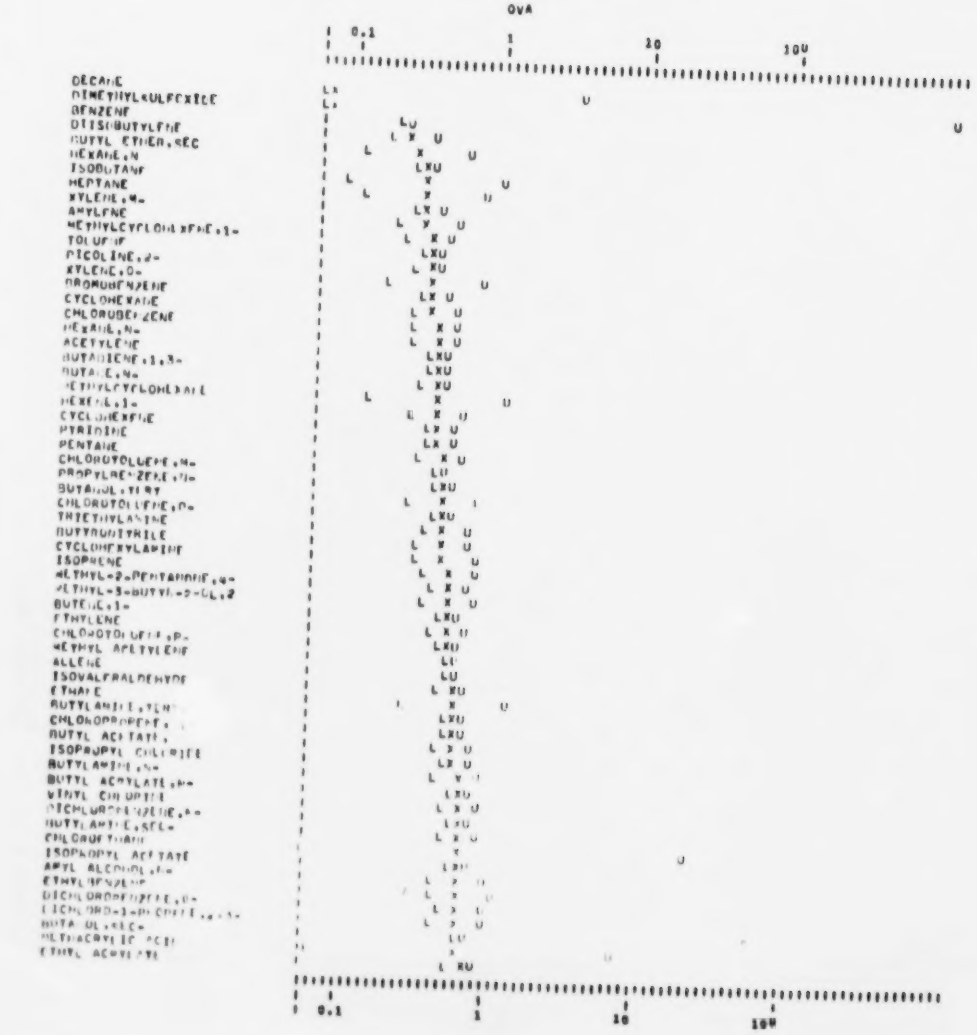

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Figure 2-1 (continued)

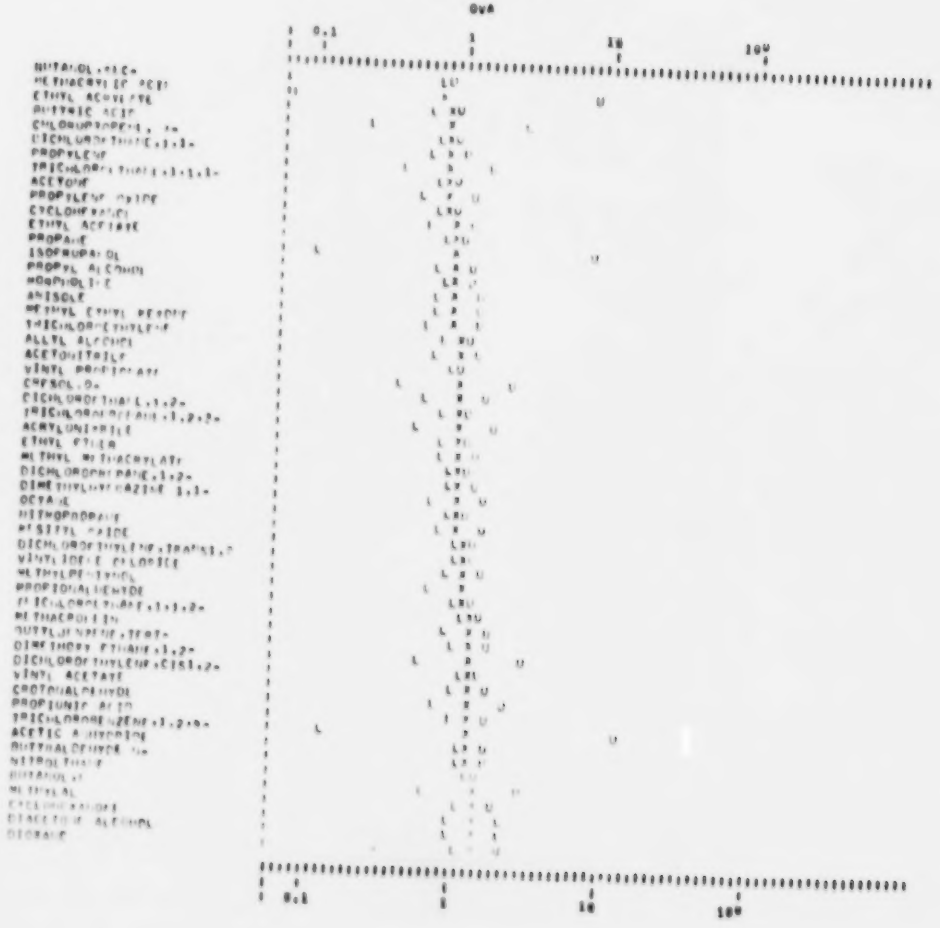

Figure 2-1 (continued)

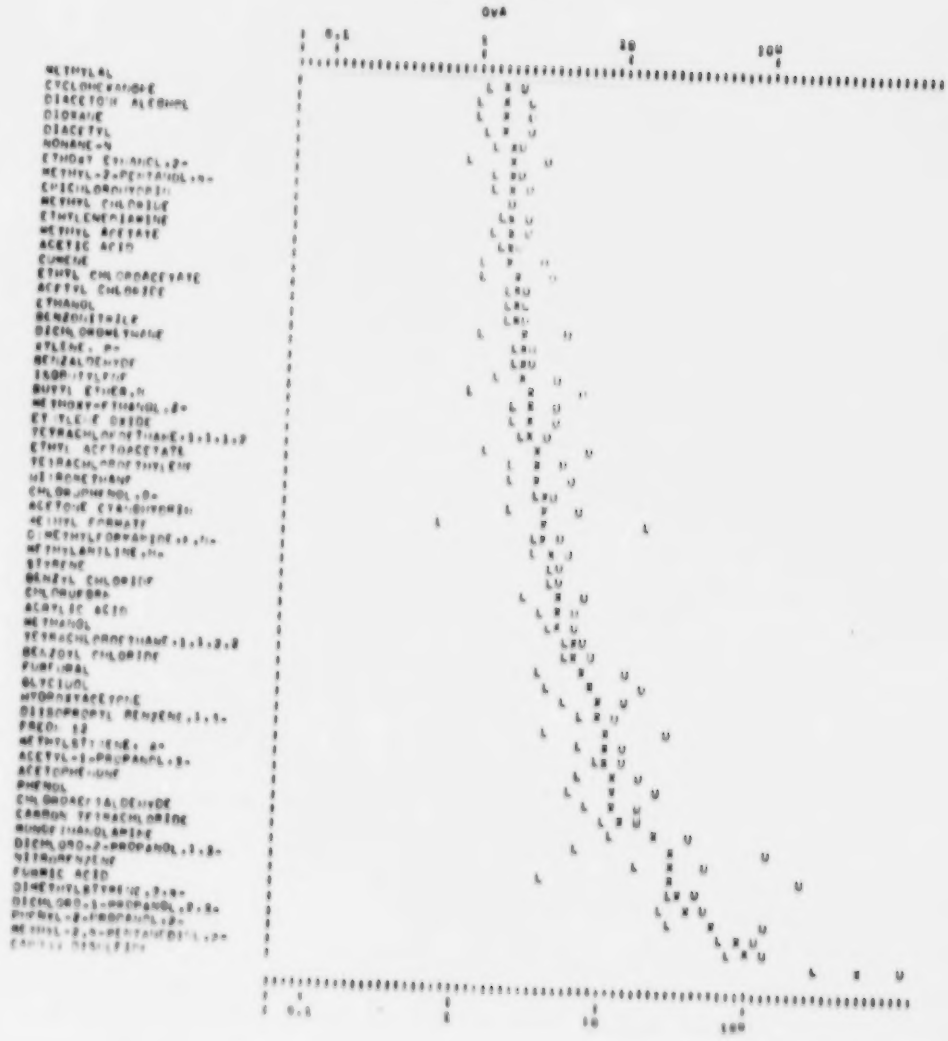

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Figure 2-2

FITTED RESPONSE FACTORS
WITH 95% CONFIDENCE INTERVALS
(AT 10.000 PPMV)

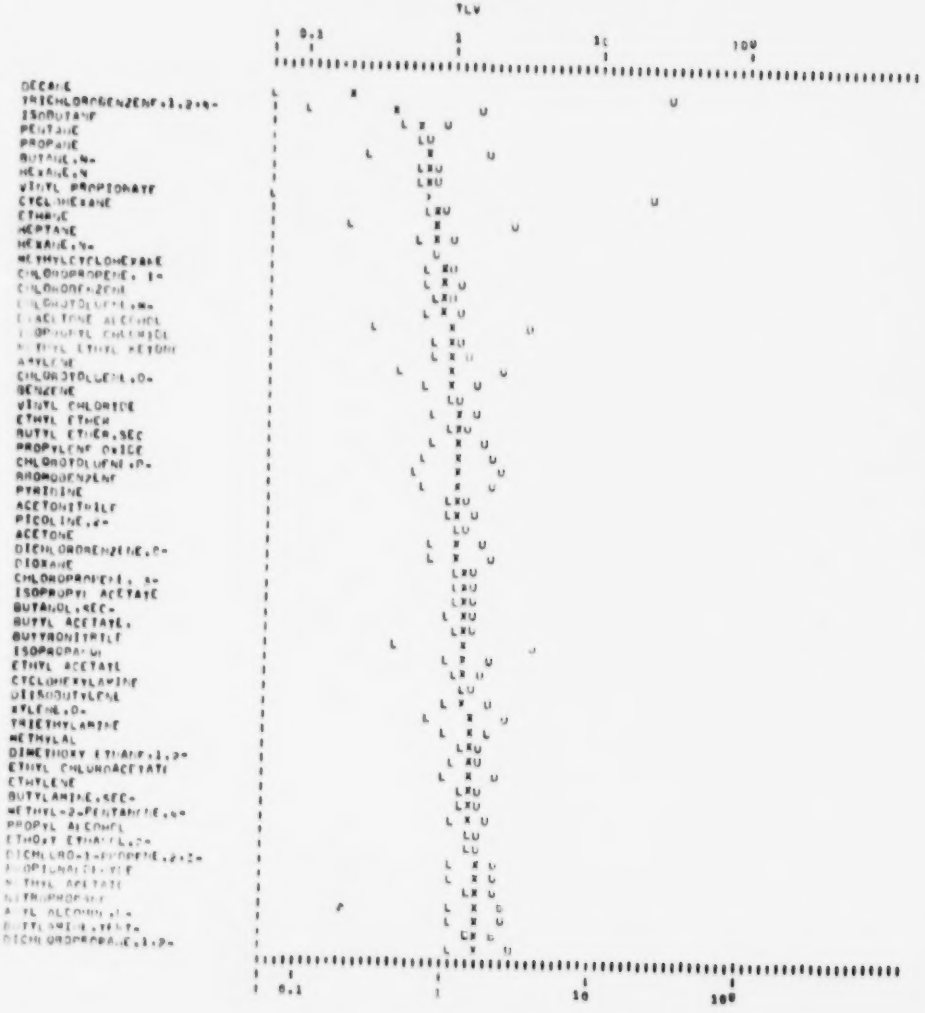


Figure 2-2 (continued)

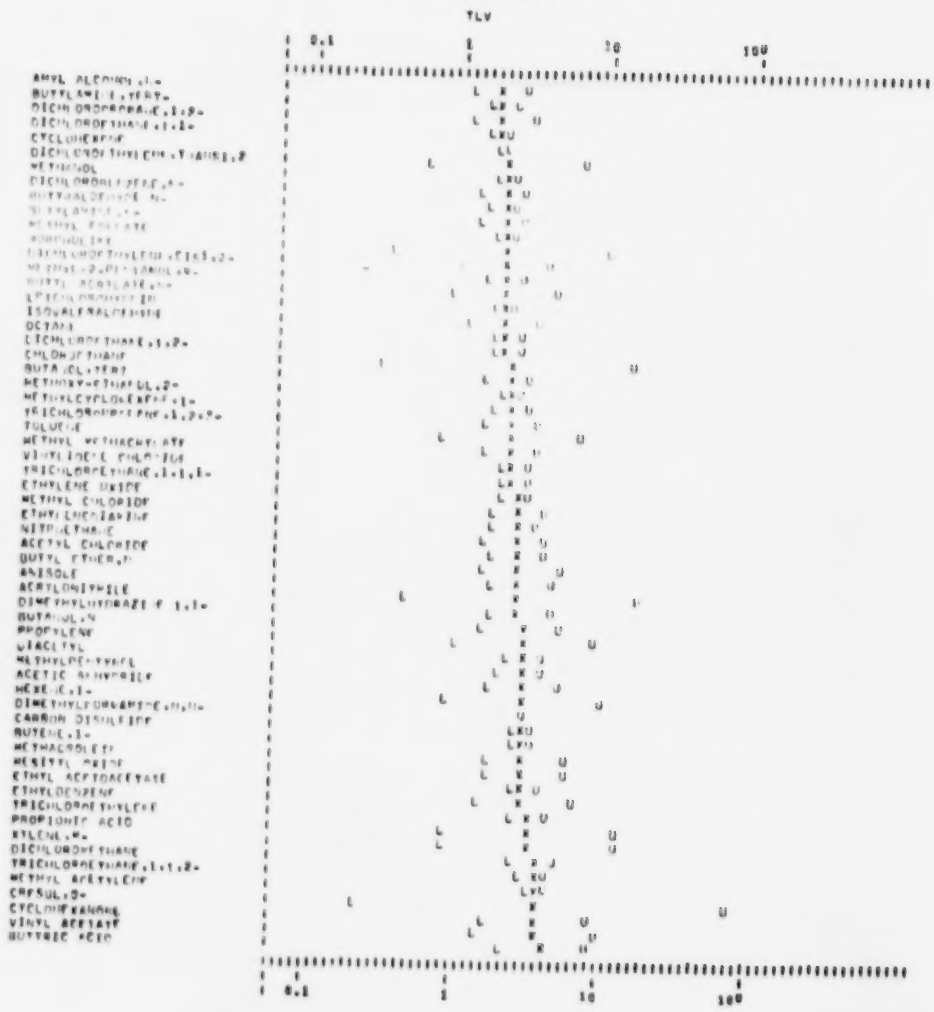
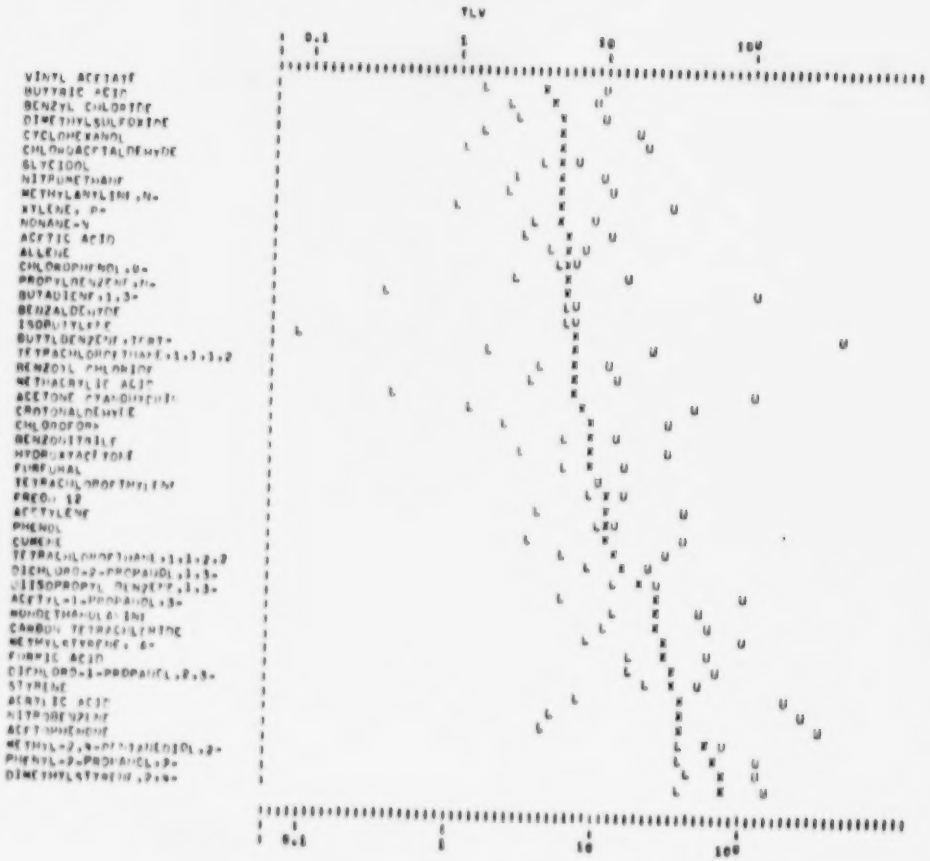


Figure 2-2 (continued)



as read directly on the OVA. Response factors are estimated at 10,000 ppmv actual concentration rather than 10,000 ppmv meter response because the experimental design and the statistical interpretation of the data are cleaner and more straightforward when the response factor is estimated in terms of an independent variable (actual concentration) rather than a dependent variable (instrument response).

Table 2-2 presents a comparison of these response factor estimates to previously published data. All previous studies on the TLV are based on hexane calibration, so a column is added giving the response factors from this study converted to a hexane basis. Even with this adjustment, there remains considerable variation between the values obtained in this study and those from literature. The primary cause of this variation is believed to be the change of response factor with concentration. Although the detailed methodology used in determining the previously published response factors is not known, it is likely that they were determined at low concentrations (in the range of 50 to 500 ppmv). This comparison adds emphasis to the dangers involved in the single point expression of response factors. If accurate results are desired for concentrations other than 10,000 ppmv, the detailed results in Section 5.0 should be used to generate an estimated response factor at the concentrations of interest.

The response factor estimates discussed above were based on data taken at three different concentrations. The target values for response factor determinations were set at 200, 1500, and 8000 ppmv. Of the 168 chemicals tested, 79 of them (or 46 percent) were able to achieve these levels.

The maximum concentration on many chemicals was limited by either volatility, instrument response, or explosivity. About 40 chemicals (or 24 percent) were not volatile enough to be prepared at 8000 ppmv at laboratory temperature. These chemicals were prepared at a maximum of 90 percent of their saturated concentration to prevent condensation in the bag and resulting inaccuracies in calculating the actual concentration.

TABLE 2-2. COMPARISON OF RESPONSE FACTORS FROM THIS STUDY TO PREVIOUSLY PUBLISHED VALUES

OCPDB* ID NO	Compound Name	OVA		TLV		
		This Study	Literature	This Study		Literature[3]
		Methane Cal.	Methane Cal.	Methane Cal.	Hexane Cal.	Hexane Cal.
70	Acetic Acid	1.83	-	5.70	7.81	3.92
90	Acetone	0.79	1.67[2]	1.22	1.67	1.50
130	Acetylene	0.37	0.50[2] 0.44[4]	11.95	16.37	1.78
170	Acrylonitrile	0.96	-	2.70	3.70	1.54
180	Benzene	0.21	0.67[2] 0.42[4]	1.07	1.47	1.02
590	1,3 - Butadiene	0.37	-	6.00	8.22	1.52
-	N - Butane	0.38	1.64[2] 1.00[4]	0.68	0.93	1.04
640	N - Butanol	1.43	-	2.80	3.84	1.44
592	1 - Butene	0.51	-	2.97	4.07	1.22
600	N - Butyl Acetate	0.60	-	1.30	1.78	2.08
760	Butyric Acid	0.74	-	4.58	6.27	1.92
790	Carbon Disulfide	571.92	-	2.96	4.05	5.92
810	Carbon Tetrachloride	21.28	10.00[2]	30.52	41.81	-
930	Chloroform	4.48	1.54[2]	8.77	12.01	-
1120	Cyclohexane	0.36	-	0.72	0.99	1.02
1140	Cyclohexanone	1.50	-	3.99	5.47	1.25
1236	Trans 1,2 - Dichloroethylene	1.13	-	1.86	2.55	4.20
2620	Dichloromethane	2.26	-	3.63	4.97	12.23
1490	N,N - Dimethylformamide	3.89	-	2.95	4.04	1.76
-	Ethane	0.57	1.11[2]	0.73	1.00	1.36
1660	Ethanol	2.04	4.00[2]	-	-	1.90
1670	Ethyl Acetate	0.84	-	1.37	1.88	2.22
1690	Ethyl Ether	0.47	-	1.11	1.52	1.30
1770	Ethylene	0.52	1.18[2] 1.54[4]	1.49	2.04	1.38
1980	Ethylene Oxide	2.72	-	2.43	3.33	2.05
2073	Furfural	7.96	-	10.01	13.71	1.89
-	Heptane	0.30	-	0.74	1.03	1.05
-	N - Hexane	0.33	-	0.73	1.00	1.00
-	Isobutane	0.30	-	0.61	0.84	1.16
2380	Isopropanol	0.90	1.54[2]	1.31	1.81	1.59
2500	Methanol	0.84	4.67[2]	1.89	2.58	3.71
2560	Methyl Chloride	1.71	-	2.78	3.36	3.81
2640	Methyl Ethyl Ketone	0.83	1.25[2]	1.00	1.37	1.60
2665	Methyl Methacrylate	0.99	-	2.40	3.23	2.40
-	Octane	1.04	0.67[4]	2.10	2.85	-
2851	Pentane	0.42	1.00[2] 1.00[4]	0.62	0.85	1.04
-	Propane	0.80	1.56[2] 1.18[4]	0.83	0.86	1.14
3070	Propanol	0.91	-	1.55	2.12	1.59
3090	Propylene	0.79	2.33[4]	2.80	3.84	1.30
3130	Pyridine	0.41	-	1.17	1.60	1.44
3230	Styrene	4.16	-	36.83	50.45	2.25
3850	Tetrachloroethylene	3.16	-	11.46	15.70	13.66
3348	Toluene	0.33	0.83[2] 0.67[4]	2.32	3.18	1.03
3410	Trichloroethylene	0.94	1.43[1]	3.35	4.59	6.40
3450	Triethylamine	0.46	-	1.41	1.93	1.05
3510	Vinyl Acetate	1.11	-	3.99	5.47	2.00
3520	Vinyl Chloride	0.65	2.86[2]	1.10	1.51	2.24
3560	O - Xylene	0.36	-	1.40	1.92	1.04

*Organic Chemical Producers Data Base.

About 49 chemicals (or 29 percent) achieved an instrument response over 10,000 ppmv prior to reaching the 8000 ppmv actual concentration. A trial and error process was used to get a readable response value at the top end of the scale (i.e., if the 8000 ppmv bag went off scale, a 6000 ppmv bag was tested, and then a 4000 ppmv, and so on until a readable response was achieved).

Only two chemicals (or about one percent) were limited by explosivity. In such cases, the maximum concentration was set at 70 percent of the Lower Explosive Limit (LEL) for obvious safety reasons.

One of the objectives of this work was to provide information to judge the suitability of these instruments to monitoring for fugitive VOC emissions in the SOCMI. Although no attempt at a final judgment will be made here, one obvious criterion of suitability can be examined. Any compound with a response factor greater than 100 will indicate less than a 10,000 ppmv action level even in pure form. But for the OVA this is complicated by flameout. The OVA depends on the sample gas flow for combustion air. When VOC concentrations in the sample gas get too high, the flame in the flame ionization detector (FID) is extinguished and the instrument ceases to respond. This will usually occur anywhere from 60,000 ppmv to 300,000 ppmv, depending on the specific compounds in the sample gas. Based on these figures, any chemical with a response factor greater than 30 would not be likely to exceed 10,000 ppmv before flame-out occurs. It can also be said that those chemicals with response factors between 6 and 30 are questionable as to whether a 10,000 ppmv reading would be noted before flameout. Of the 168 chemicals tested, only 6 have response factors greater than 30 and only 20 have response factors greater than 6. Since most of these will seldom occur in pure form, but rather in mixtures with more responsive chemicals, this should not prove to be a serious problem.

2.2 LINEARITY OF OVA RESPONSE

As explained in the previous subsection, most of the response factors were based on data taken at three concentrations. A three point data set will allow an evaluation of the overall linearity of response, but it has been suggested that the response may be linear only up to some critical concentration at which point it diverges. It has also been theorized that this critical concentration may be related to the Lower Explosive Limit (LEL) of the subject chemical. To test these theories, three chemicals were tested at ten or more concentrations. The selected chemicals (n-hexane, benzene, and methanol) were chosen to provide a range of organic functional groups, volatilities, LEL's, and response factors.

The data on n-hexane is presented in Figures 2-3 and 2-4. The first plot shows OVA response vs. actual concentration. This could be interpreted as a single linear data set if one is willing to accept a moderate degree of scatter. There do appear to be some break points with more linear segments between them, but no clear definition is evident. Figure 2-4 presents the same data, but it is plotted as actual concentration vs. response factor. This type of presentation accentuates the break points which would seem to occur at about 500 ppmv and 2000 ppmv. Both of these are well below hexane's LEL of 11,000 ppmv.[5] The instrument response reaches full scale at an actual concentration of about 3700 ppmv, so no meaningful data could be taken beyond that point.

The data on benzene are presented in similar fashion in Figures 2-5 and 2-6. The first plot appears to be quite linear throughout the concentration range, but a slight break point can be identified in the response factor plot. This break occurs at about 1400 ppmv, or ten percent of the benzene LEL (14,000 ppmv).[5]

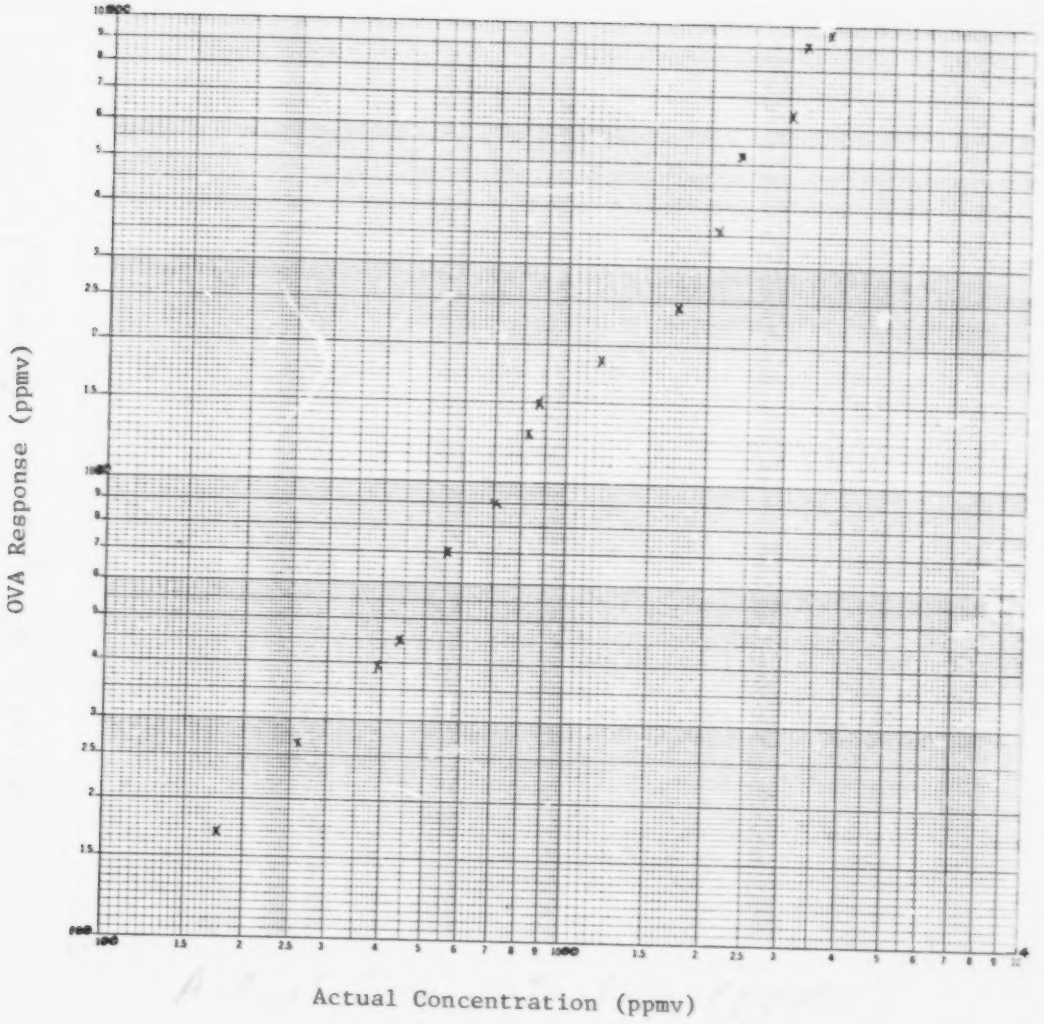


Figure 2-3. Linearity of OVA response to n-hexane.

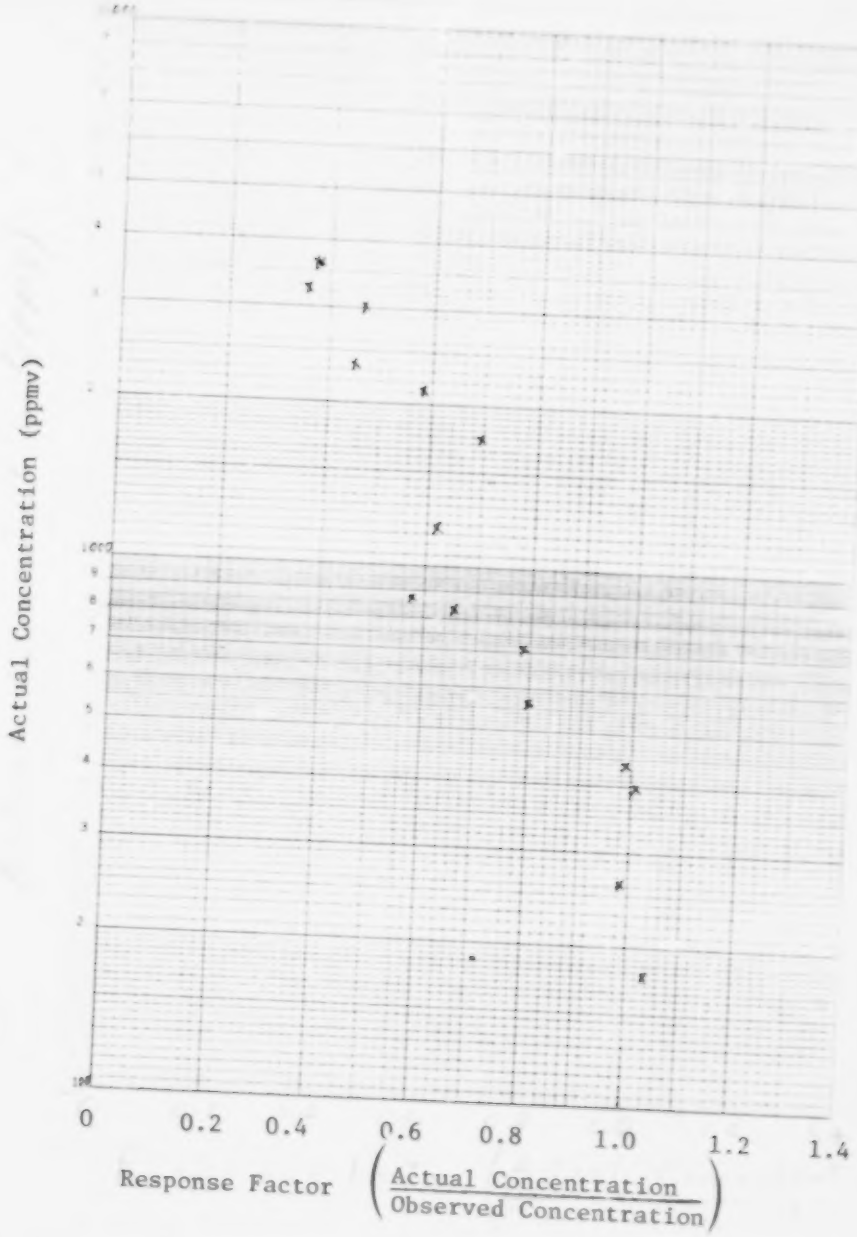


Figure 2-4. Variation of response factor with concentration - n-hexane.

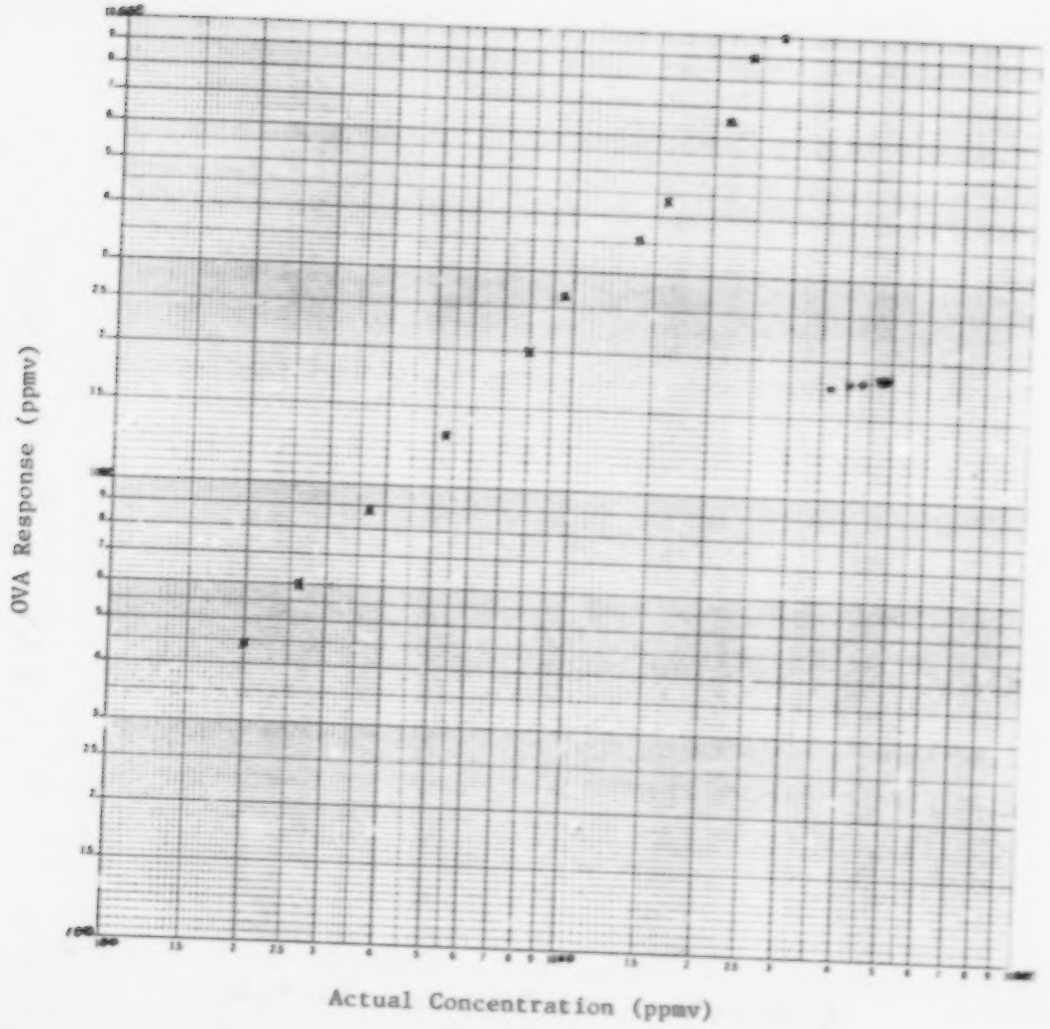


Figure 2-5. Linearity of OVA response to benzene.

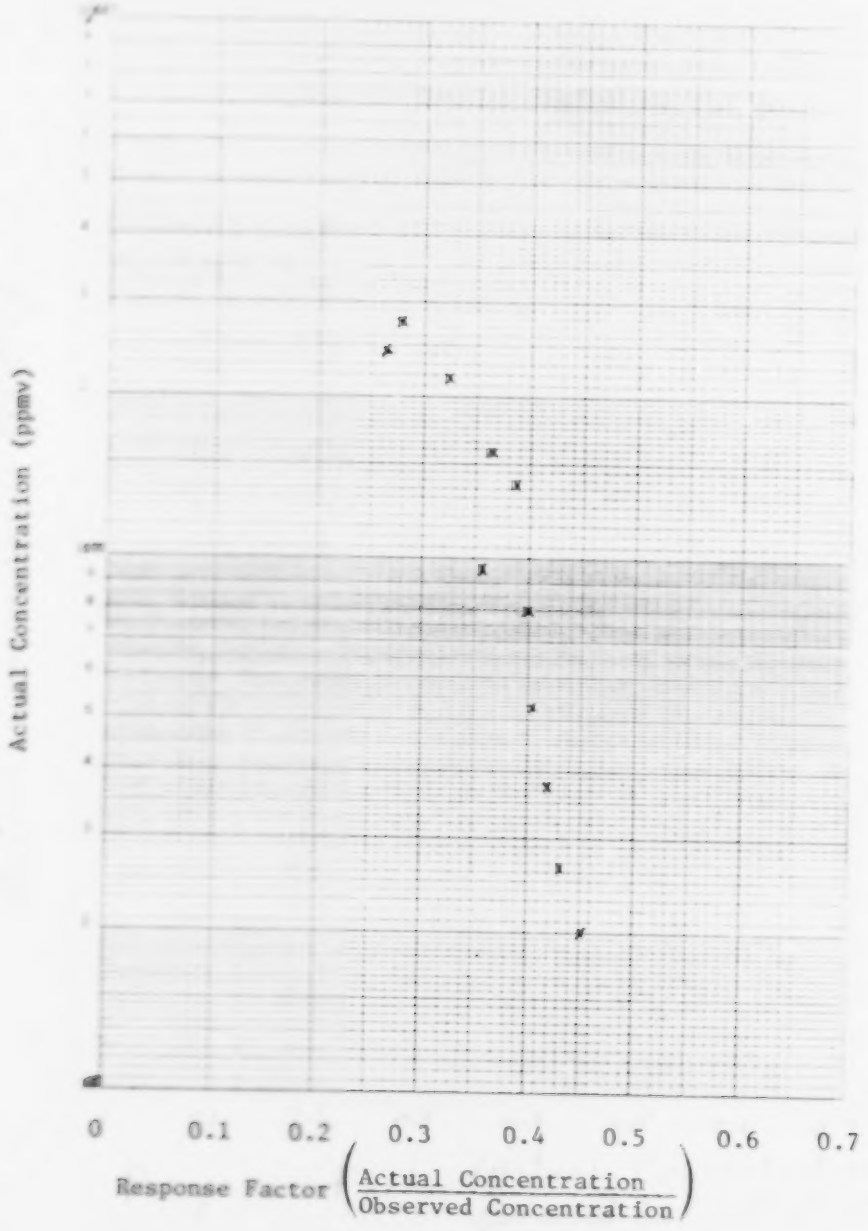


Figure 2-6. Variation of response factor with concentration - benzene.

Similar data on methanol are presented in Figues 2-7 and 2-8. The first plot would suggest a gently ascending curve, but it could be roughly fit with two linear segments intersecting at about 1600 ppmv. This inflection point would be quite low compared to the methanol LEL of 67,200 ppmv.[5] An examination of Figure 2-8 reveals a parabolic curve in the relationship between response factor and actual concentration, with a maximum response factor of about 7 exhibited in the concentration range of 2000 to 8000 ppmv. A second inflection point is noted around 8000 ppmv or 12 percent of the LEL.

All of these data would seem to indicate that the relationship between instrument response and concentration is a complex one. The scatter in the experimental data makes it difficult to state with confidence that any segment of the response is truly linear. There appear to be inflection points in the data, but there are not enough data to assess the relationship of these points to the LEL. These examples do clearly illustrate the large degree of variability in the response factors with concentration and should, therefore, demonstrate the need for care in applying a response factor calculated for one specific concentration.

2.3 CONVERSION OF RESPONSE FACTOR BASIS

The data presented in this report base all response factors on calibration to methane. Methane was chosen because of its ease of availability, its volatility (sufficient to prepare standards in the range of the proposed action level of 10,000 ppmv), and its use as the factory calibration standard for the OVA. For one reason or another, it may be more convenient for any given operator to calibrate with some other chemical and to convert the response factors to that calibration basis.

It has been theorized that this conversion can be accomplished in the following manner:

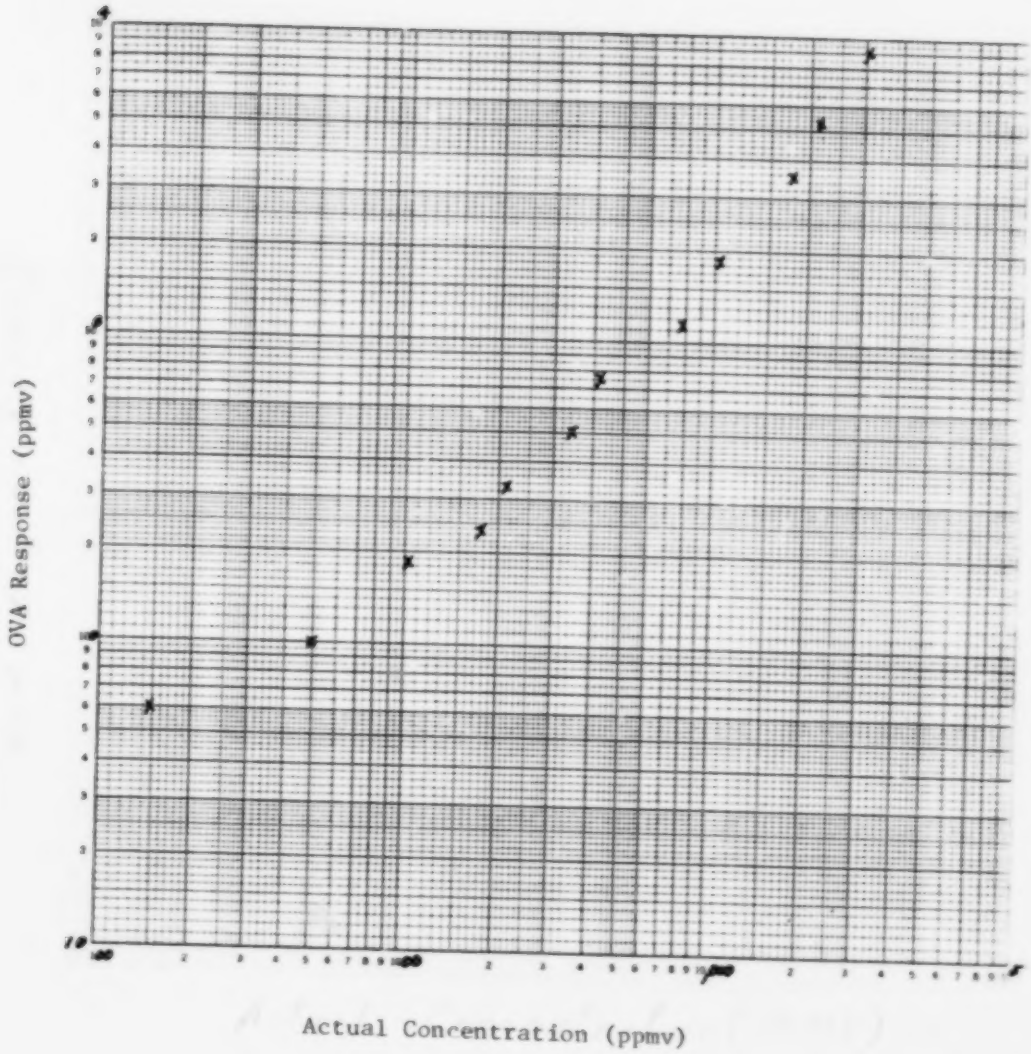


Figure 2-7. Linearity of OVA response to methanol.

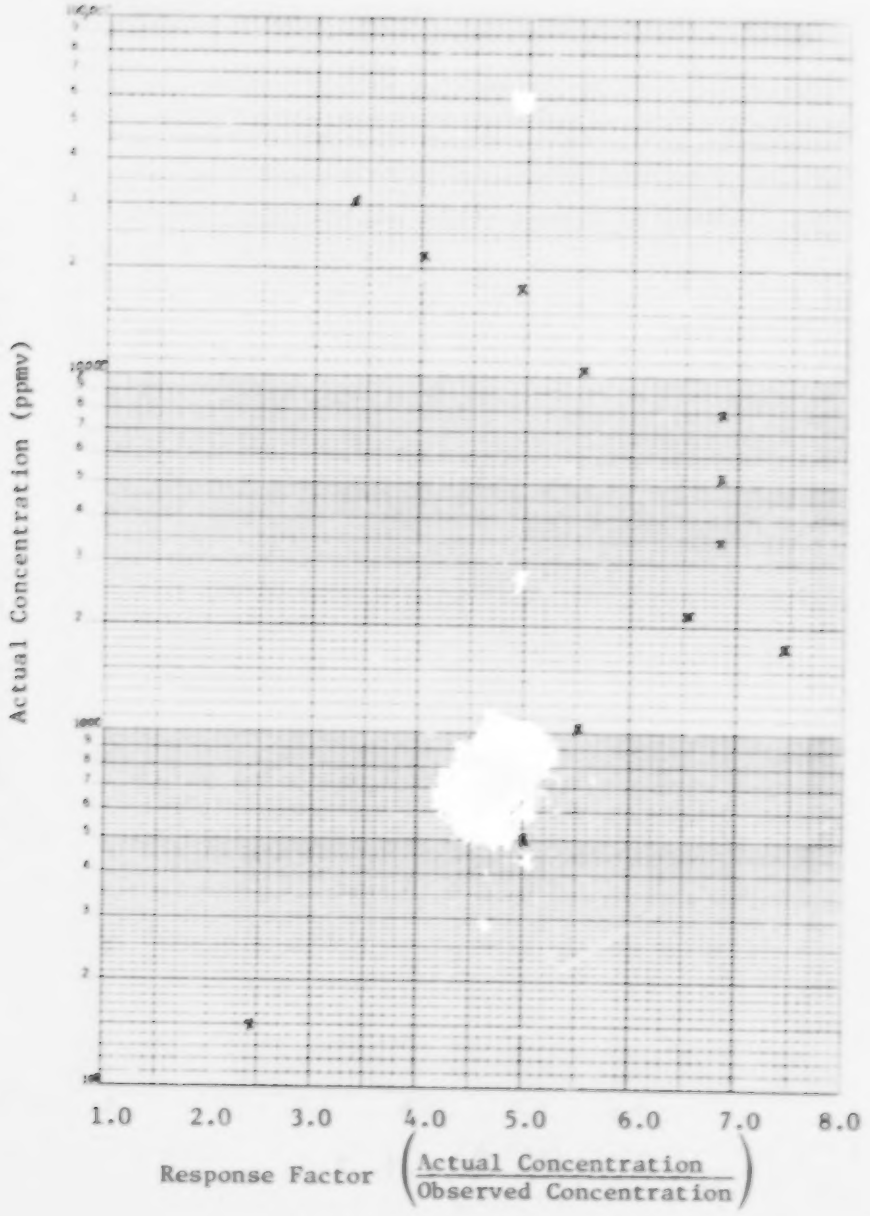


Figure 2-8. Variation of response factor with concentration - methanol.

$$RF_{AX} = \frac{RF_{AM}}{RF_{XM}}$$

where RF_{AX} is the response factor of chemical "A" as calibrated to chemical "X",

RF_{AM} is the response factor of chemical "A" as calibrated to methane, and

RF_{XM} is the response factor of chemical "X" as calibrated to methane.

In order to test this theory, the instruments were calibrated to n-hexane and the methane standards were run.

The data from these tests show that such a procedure works well on the TLV, where a predicted response factor of methane based on hexane of 1.50 compares favorably with the observed values of 1.56 at 533 ppmv and 1.50 at 8000 ppmv. The OVA results were not so conclusive, however, with a predicted value of 2.77 varying significantly from the observed values of 5.16 and 4.32 at 8000 and 533 ppmv respectively. It is possible that the variation of response factor with concentration is the cause of this discrepancy. The estimated response factor at 10,000 ppmv of hexane relative to methane is used to predict the response with reverse calibration. The OVA is calibrated on methane at 8000 ppmv in one case and on hexane at 5500 ppmv in the other case (because that is the highest stable concentration achievable at laboratory conditions). All these factors make the comparison difficult and much more extensive work would be required to confirm or reject the conversion procedure for the OVA.

SECTION 3

TEST PROCEDURES

The experimental procedures used to determine response factors are quite simple in theory, merely requiring that a calibrated instrument be used to sample a gas of known concentration. The response factor is then defined as the ratio of the actual concentration to the concentration indicated on the meter. The following subsections will present the detailed procedures involved in calibration, preparation of standard gases, instrument sampling, and quality control.

3.1 DESCRIPTION OF THE INSTRUMENTS

Two types of instruments were used in the laboratory study, the Century Systems "OVA-108" and the J. W. Bacharach "TLV Sniffer". These particular instruments were chosen because they had both been successfully used in previous fugitive emission studies. Two instruments of each type were tested to check for normal variance between individual instruments and to check for any operating problems. One old and one new instrument of each type were selected to determine if there were any variances in response with detector age.

The Century Systems "OVA-108" is a portable flame ionization detector (FID) with a gas chromatograph option. In the total hydrocarbon mode used for fugitive emission screening, the chromatograph column is bypassed and the sample gas is introduced directly to the detector. The unit is battery powered and has its own hydrogen cylinder with enough fuel for 8 to 10 hours of continuous operation. The unit is certified to be intrinsically safe for operation in explosive atmospheres by Factory Mutual.

The readout on the OVA-108 is logarithmic and has a range from 1 to 10,000 ppmv. The range can be extended by the use of a dilution probe, but this feature was not used in the response factor study. Since the sample is diluted before it reaches the detector, no new response data would be gained by sampling higher concentrations with the dilution probe.

There are some important differences between the construction of the OVA and that of a "standard" laboratory FID. In the laboratory version, the hydrogen is mixed with the sample gas before combustion, and the flame is supported by an independent air supply. The OVA draws its combustion air through the sample probe, which is thus mixed with the sample gas. The OVA flame will, therefore, be extinguished if the VOC concentration gets too high or if a standard in N_2 is used instead of one in air. More importantly, there seem to be differences in the degree of ionization achieved with the OVA style FID as compared to the standard laboratory FID.

The J.W. Bacharach "TLV Sniffer" is a combustible gas detector. The sample gas is passed across a wire coated with oxidation promoting catalyst. Any combustible material is oxidized and the heat released causes the resistance of the coated wire to change. Half of the sample gas is routed through a comparison cell with an identical wire that has no catalyst coating. Both wires are set in a bridge network and the comparative resistance change is read out on a galvanometer. The face of the meter readout is marked directly in ppmv as factory calibrated to hexane. The response of the TLV thus depends on the heat of combustion and heat capacity of the sample gas.

3.2 CALIBRATION PROCEDURES

All instruments were checked for calibration at the start of each day, after any prolonged shutdown, and at any other time that the operator suspected that the calibration had drifted. Two "Class A" standards were purchased from Scientific Gas Products in Pasadena, Texas, for use in the calibration checks. The instruments were actually calibrated to the 7993 ppmv

methane-in-air standard (certified to ±10 ppmv). The 533 ppmv methane-in-air standard (certified to ±1 ppmv) was used to check the linearity of the OVA calibration and, thereby, to detect any instrument malfunctions.

The OVA calibration procedure was initiated with a 20 to 30 minute warm-up period. The instrument was then checked against and reset to its internal electronic standards. The flame was ignited and stabilized, and a bag of the 7993 ppmv standard was sampled. The instrument response was recorded, and the reading adjusted (if necessary) using the "calibrate" knob. The flame was extinguished, and the internal standards checked and readjusted using the "gas select" knob. This procedure was repeated until the instrument responded properly to both the primary methane standard and the internal electronic standards. A bag of the 533 ppmv standard was then sampled and the result recorded. No adjustments were made based on the lower calibration check since the OVA is set up for a single point external calibration. Its span is set by the high and low electronic standards. This lower calibration check was only intended to detect equipment malfunctions, such as preamplifier failure.

During the latter stages of the program, the TLV calibration procedure was quite similar. The instrument was warmed up and zeroed on hydrocarbon-free (zero-grade) air. The 7993 ppmv methane standard was sampled, the result recorded, and the response adjusted (if necessary). The 533 ppmv standard was also read, recorded, and adjusted (the TLV has a separate potentiometer for calibrating each decade of readout response).

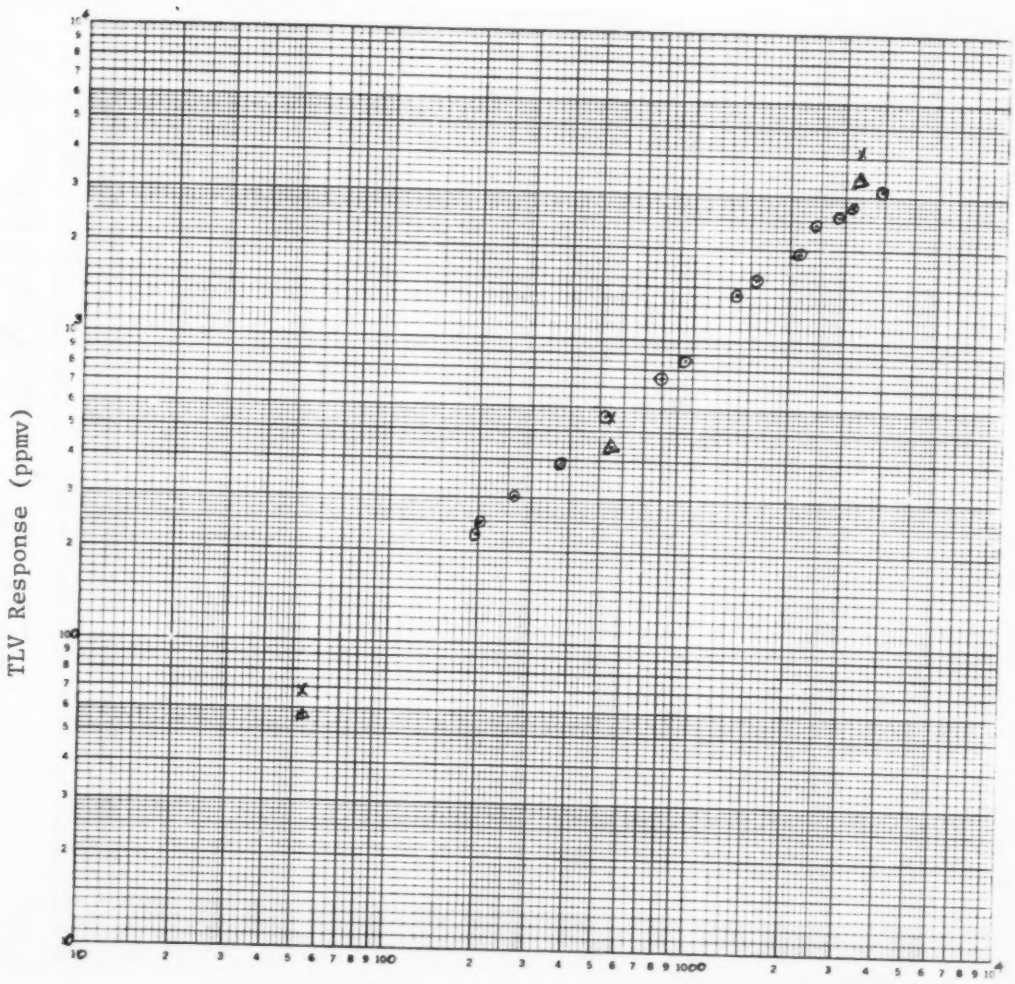
During the early stages of the program, the TLV's were mistakenly assumed to be permanently calibrated at the factory to n-hexane. The methane standards were read daily and the results recorded, but the instrument response was not adjusted to read exactly the standard value. It was necessary, therefore, to develop a numerical correction factor to convert the indicated response from a hexane to a methane basis. For instance, if TLV #7C read 380 ppmv when it

was checked on the 533 ppmv standard, then its readings were multiplied by the factor 1.403 (which is 533 divided by 380). In order to test this correction procedure, six chemicals (which had been run in the early part of the program) were rerun under the proper calibration procedure. Figures 3-1 through 3-6 show a graphical comparison of the corrected original response and the response during the recalibrated runs. While there is certainly some scatter among these data points, there is no perceptible bias between the corrected and recalibrated data sets. The magnitude of random variance in the corrected data appears to be only slightly greater than that of the recalibrated data. Based on these observations, it can be stated that the correction procedure is valid and that it should not have a significant negative effect on the overall precision of the TLV response data. All response factors for TLV's presented in this report are either corrected or recalibrated values.

3.3 GENERATION OF STANDARD GASES

The determination of instrument response factors requires that gas samples of known concentration be prepared. Concentrations of chemicals which are liquids at room temperature are calculated gravimetrically, from a measured weight of the liquid injected into a measured volume of "zero-grade" (hydrocarbon free) air. Concentrations of chemicals which are gases at room temperature are calculated volumetrically. The details of sample preparation follow in three parts:

- preparation of bags,
- preparation of standards from liquids, and
- preparation of standards from gases.

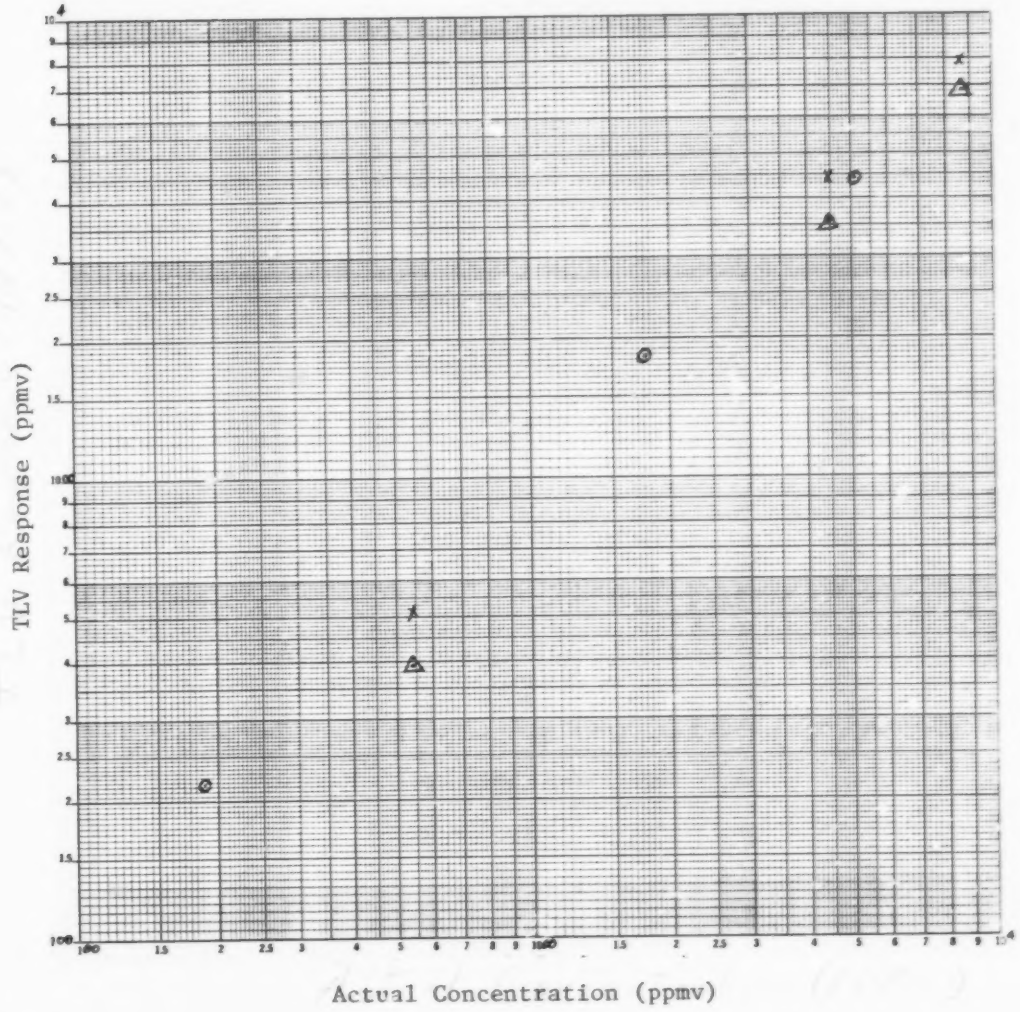


⊙⊙⊙ Recalibrated Response

x x x Corrected Response (TLV 7C)

△△△ Corrected Response (TLV 7E)

Figure 3-1. TLV recalibration check - benzene.

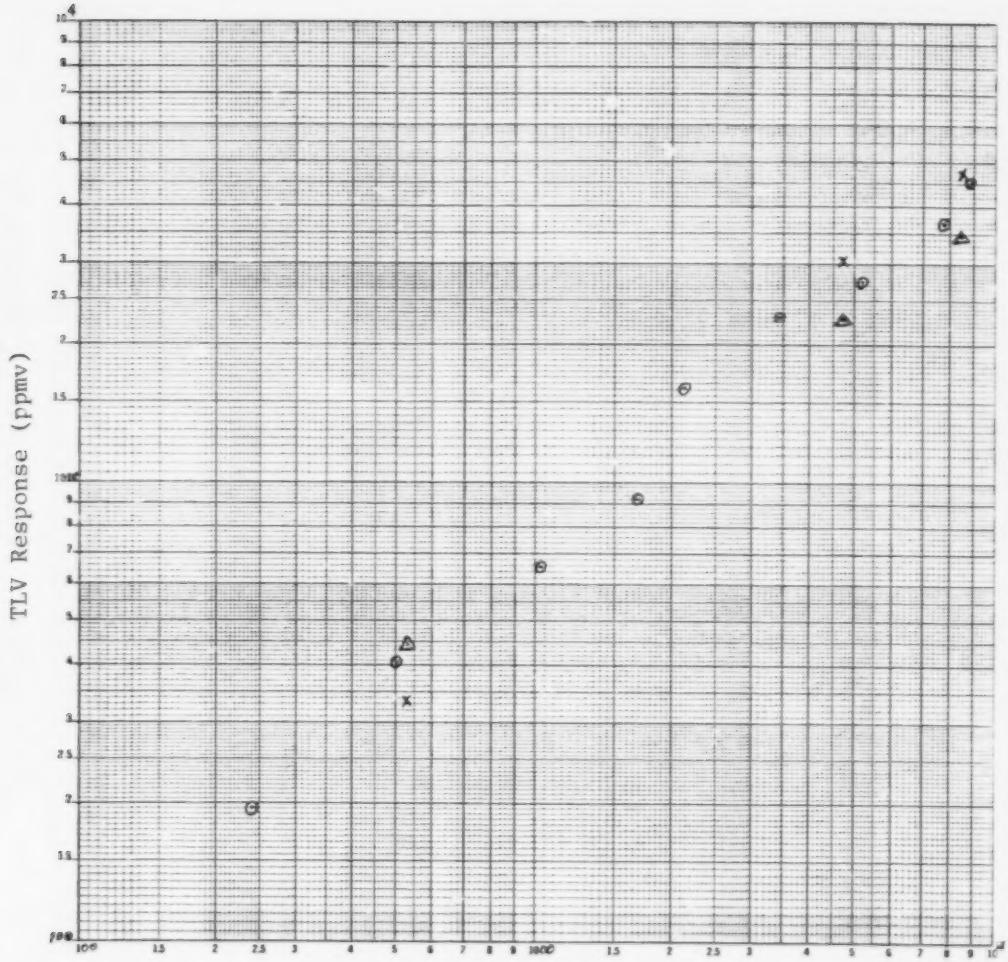


⊙⊙⊙ Recalibrated Response

x x x Corrected Response (TLV 7C)

△△△ Corrected Response (TLV 7E)

Figure 3-2. TLV recalibration check - methyl ethyl ketone.

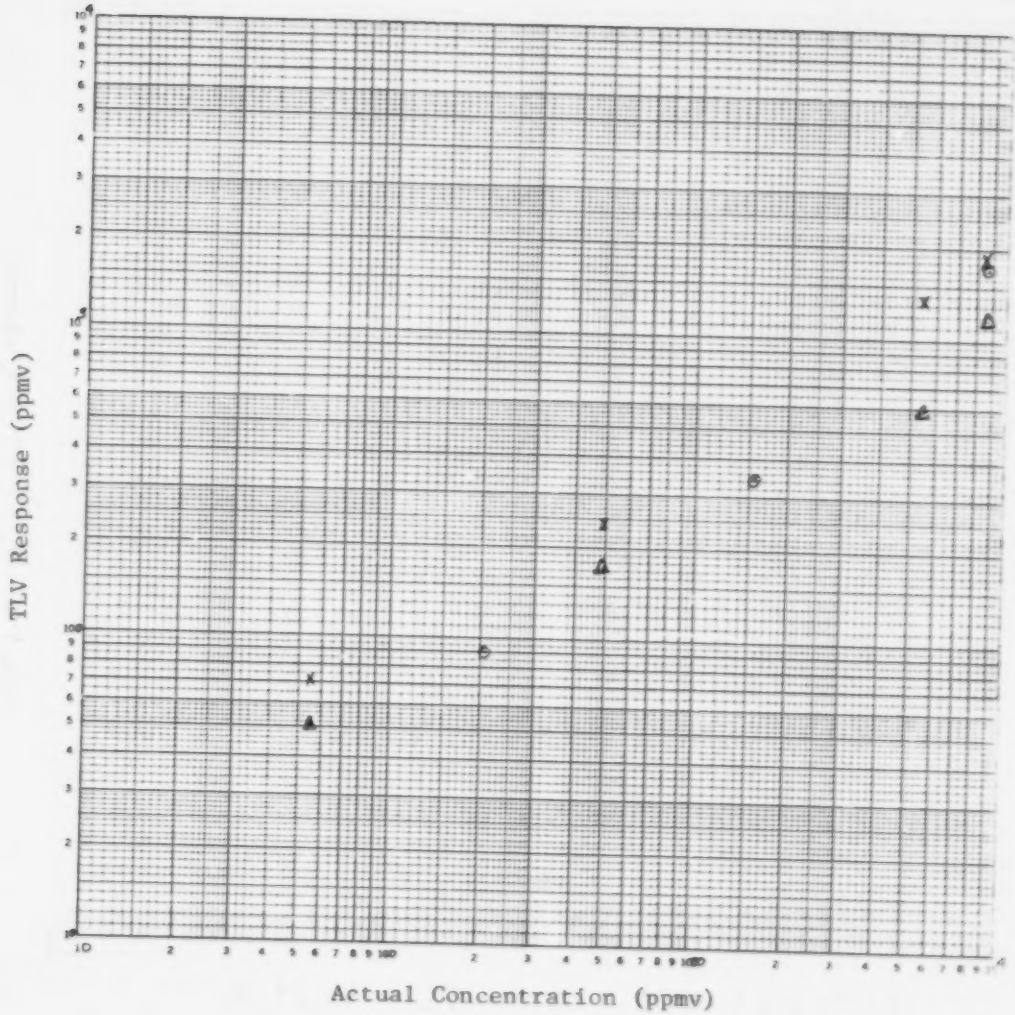


⊙⊙⊙ Recalibrated Response

x x x Corrected Response (TLV 7C)

△△△ Corrected Response (TLV 7E)

Figure 3-3. TLV recalibration check - methanol.

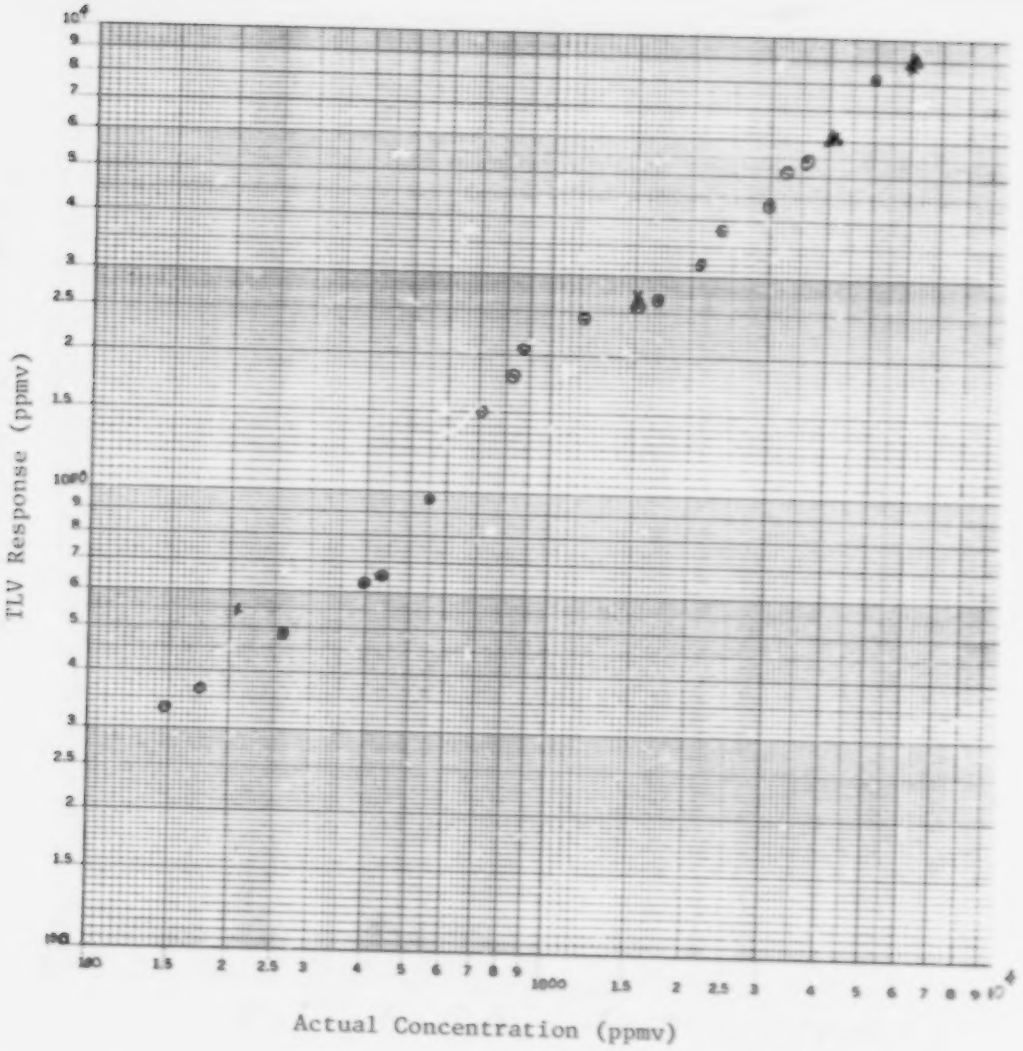


⊙⊙⊙ Recalibrated Response

x x x Corrected Response (TLV 7C)

△△△ Corrected Response (TLV 7E)

Figure 3-4. TLV recalibration check - acetic acid.

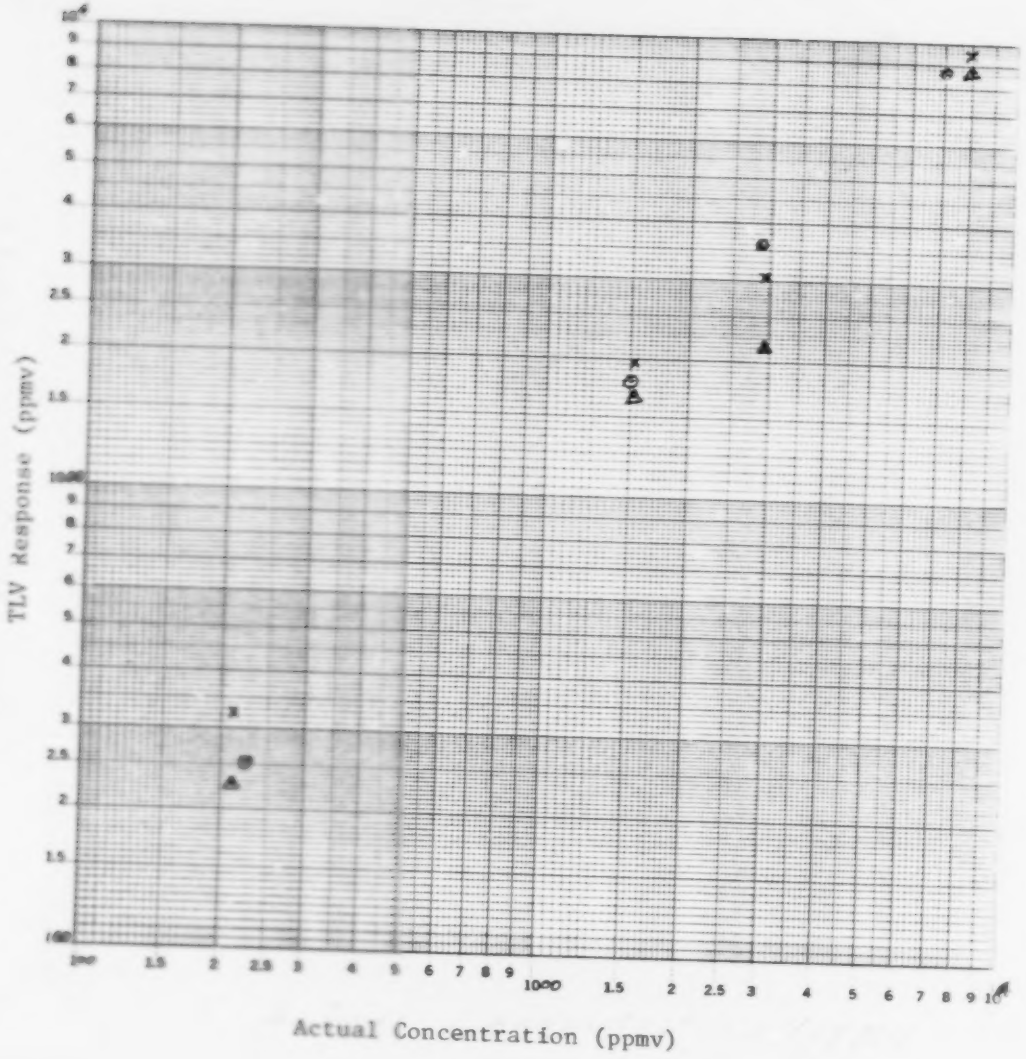


⊙⊙⊙ Recalibrated Response

x x x Corrected Response (TLV 7Q)

△△△ Corrected Response (TLV 7M)

Figure 3-5. TLV recalibration check - n-hexane.



⊙⊙⊙ Recalibrated Response

x x x Corrected Response (TLV 7Q)

△△△ Corrected Response (TLV 7M)

Figure 3-6. TLV recalibration check - chlorobenzene.

3.3.1 Preparation of Sample Bags

All the standard gas mixtures used in this study were prepared or collected in chemically-inert gas sampling bags. The early work was done with the aluminized snout bags manufactured by Calibrated Instruments, Inc., but these were later replaced by Tedlar bags manufactured by Engineered Devices, Inc. The bulk of the data was taken using the Tedlar bags, which were preferred for three reasons:

- the Tedlar was believed to be more inert and resistant to adsorption or permeation,
- the clear bags allowed visual inspection of the interior for condensation or contamination, and
- the Tedlar bags were equipped with two valves to facilitate flushing between runs.

The first step in the preparation of each bag was measurement of its volume. This was done by filling the bag completely with air but not at higher than atmospheric pressure, and then emptying the bag into an inverted graduated cylinder filled with water. The volume of water displaced was measured on the graduate, and the standard volume of the bag calculated from that volume by correcting for barometric pressure, ambient temperature, and the partial pressure of water in the trapped air. The calculated volume and an identification number were then imprinted on the bag.

Each bag had to be thoroughly conditioned between runs to prevent cross-contamination. The Tedlar bags were attached to a flushing manifold and continuously purged with ambient air for not less than fifteen minutes. The bags were then evacuated and filled with zero-grade air. The snout bags had only a single valve, which made a continuous purge impractical. They were successively filled and evacuated until no residual hydrocarbons could be detected.

3.3.2 Preparation of Standards from Liquids

Standard gas mixtures of chemicals which were liquids at ambient laboratory conditions were prepared by injecting a known weight of the liquid through a septum into a sample bag filled with a known volume of zero-grade air. Three target concentrations were prepared for each chemical, usually 200, 1500, and 8000 ppmv. Occasionally it was not feasible to prepare an 8000 ppmv mixture because of the chemical's volatility or explosivity. For chemicals with relatively low vapor pressures, the upper concentration was limited to 90 percent of the saturated concentration at ambient conditions to prevent condensation in the bag. For obvious safety reasons, no gas mixtures were prepared in excess of 70 percent of the Lower Explosive Limit (LEL).

For each target concentration, the required volume of the liquid chemical was calculated and then measured in a microliter syringe. The syringe was weighed on an electronic balance before and after injection into a clean sample bag filled to capacity with zero-grade air. The bag was then set aside for several minutes to allow the mixture to come to equilibrium before testing. The concentration in the bag can then be calculated by the following relationship:

$$C_A = (62.36 \times 10^6)\ (W_i - W_f)\ (T)/(V)\ (MW_A)\ (BP)$$

where C_A is the concentration of chemical "A" in parts per million by volume (ppmv),

62.36×10^6 is a combined constant with the units (liters) (mmHg)/(g-mols) (°K). This constant incorporates the ideal gas volume of 22.4 liters per g-mol., standard temperature and pressure, and a factor of 10^6 to go from volume fraction to ppmv.

W_i and W_f are the initial and final weights of the syringe in grams,

T is the laboratory temperature in °K,

V is the sample bag volume in liters,

MW_A is the molecular weight of chemical "A", and

BP is the barometric pressure in mmHg.

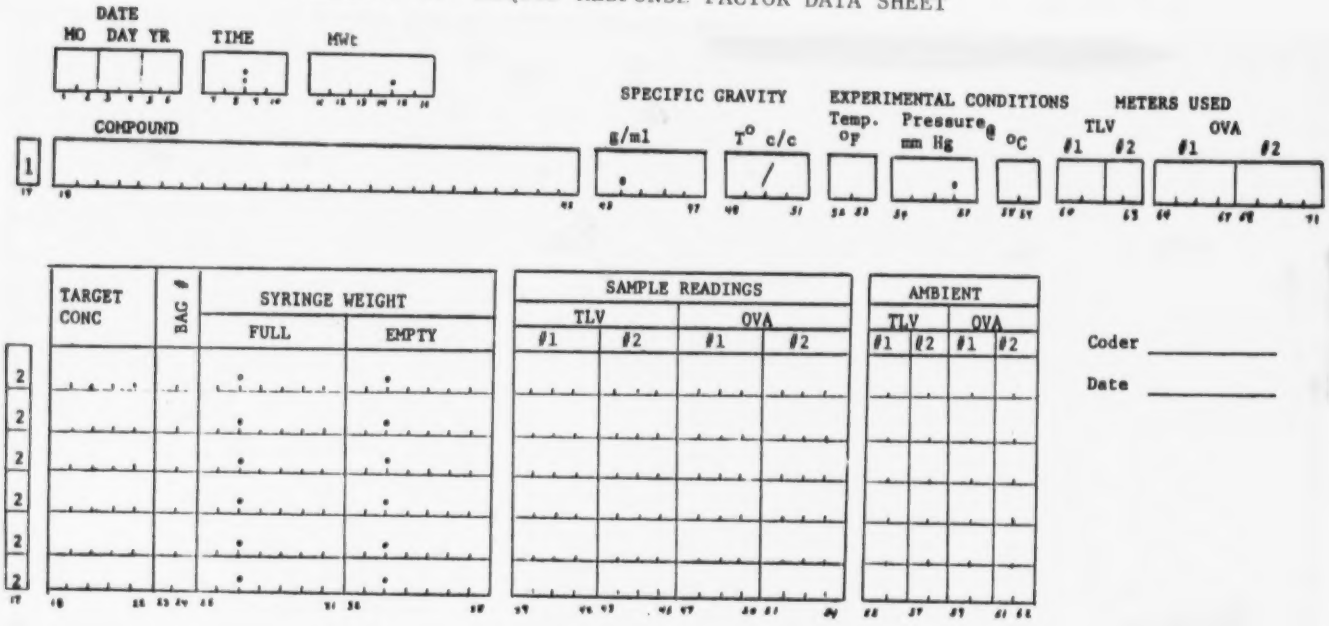
These data were collected on a computer-coded sheet shown as Table 3-1.

The two major sources of error in the preparation of standards from liquids were errors in the measurement of bag volumes and errors in the weighing. Only one bag volume was measured twice, but the results were remarkably consistent. The first measurement resulted in a volume of 5.27 liters and the second measurement yielded a volume of 5.29 liters, for a difference of only 0.4% between the two measurements. Six "identical" bags made by one manufacturer were also measured, and the volumes ranged from 5.07 liters to 5.66 liters with a mean value of 5.35 liters. This indicated a range of values within ±5 percent of the mean value. While most of this variation was probably due to real differences in the volumes of the individual sample bags, it did provide a very conservative estimate of the variability in determining sample bag volumes.

The precision of the weighing step was much better than that of bag volume measurement. The Mettler electronic balances (Models H51 and H35 AR) were accurate to ±0.0001 gram. This resulted in an uncertainty of ±0.05 percent when preparing the nominal 8000 ppmv bags, and up to 2.0 percent when preparing the 200 ppmv bags.

The variance in the calculated concentration of standards prepared from liquids can then be estimated by a standard statistical formula which relates the variance of a ratio to the individual variance of the numerator and

TABLE 3-1. LIQUID RESPONSE FACTOR DATA SHEET



Target
Ci, ppmv x 4.464×10^{-8} x Vt, ℓ x MW ÷ $\rho_L^{Texp.}$ = Vi, µℓ

Notes, Comments

denominator.[6] In this case, the coefficient of variation in the calculated concentration was estimated to be ±4.0 percent for an 8000 ppmv standard and ±4.4 percent for a 200 ppmv standard.

3.3.3 Preparation of Standards from Gases

A gas mixing apparatus was used to prepare standards of chemicals which were gases at room temperature and of some very volatile liquids. Standard mixtures of these chemicals were purchased in pressurized cylinders at or above the highest required concentration (8000 ppmv). As described in the previous subsection, at least three standards were prepared for each chemical with concentrations ranging from 150 to 8000 ppmv.

The mixing apparatus is shown schematically in Figure 3-7. It consists of two parallel supply and metering systems, one for zero-grade air and the other for the sample gas. Target flow rates were calculated for each stream, and the initial flow rates set using the rotameter. The flow of each stream was then diverted to the bubble meter by a 3-way valve for a precise measurement of the flow rate. Both streams were then redirected through the rotameter, which served both as an indicator of any flow variance and as a mixing chamber. The outlet of the rotameter was collected in a sampling bag. After filling the bag, both streams were diverted to the bubble meters for another flow measurement. The average flow measurements were then used in the following equation:

$$C_m = (F_s)\ (C_s)/(F_s + F_a)$$

where C_m is the concentration of the standard mixture to be prepared in ppmv,

C_s is the concentration of the chemical of interest in the sample gas from the purhcased cylinder,

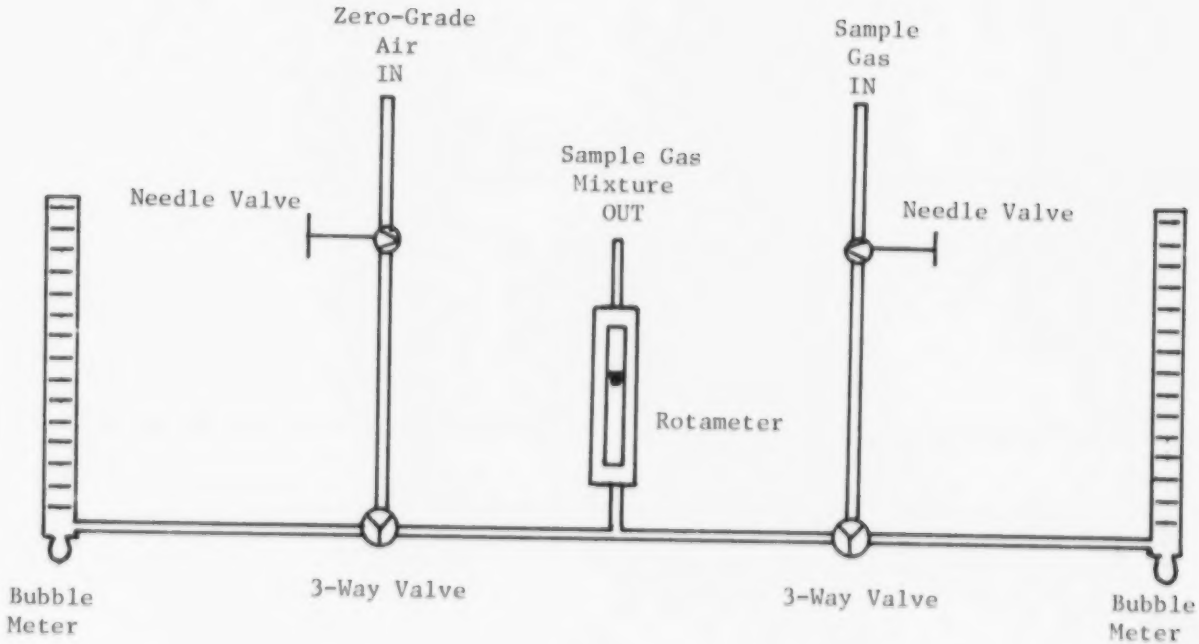


Figure 3-7. Gas-air mixing apparatus.

F_s is the flow rate of the sample gas in milliliters per second, and

F_a is the flow rate of air in milliliters per second.

These data were collected on a computer coded sheet shown as Table 3-2.

The primary factors which contributed to uncertainty in the calculated concentration were variances in the measured flow rates and the precision of C_s, the concentration of the subject chemical in the purchased sample gas. Normally the sample gases were purchased at about 15,000 ppmv in air and were certified to ±2 percent of that concentration (or about ±300 ppmv). This varied according to the individual gas supplier and type of gas, but the above figures were chosen to represent an "average" situation.

The flow rates were measured on bubble meters with a volume of 100 ml., and the physical measurement was the time for a bubble to travel the column. The stopwatch used was accurate to ±0.01 second, but operator reaction time and variations in reading the slightly curved bubble caused the time measurement to be no better than ±0.2 seconds. This represents a range of variation of about ±3.3 percent for the air measurement which was normally in the 6 second range.

The sample gas times varied from about 5 seconds up to about 30 seconds depending on the desired concentration, which would suggest a range of variation of 0.6 to 4.0 percent. This was true for two repeated readings with little elapsed time in between, but when the readings were repeated a third time after the bag was filled, somewhat larger variations were noted. This was probably due to inadequate flow regulation in the small, low pressure gas cylinders. The range of variation on the lower concentration standards was ±3 seconds at the 20 second level, or about ±15 percent variation. For the higher concentration standards, the variation was about ±1 second at the 5 second level, or about ±20 percent variation.

TABLE 3-2. CAS RESPONSE FACTOR DATA SHEET

DATE MO DAY YR | TIME | MWt

COMPOUND

EXPERIMENTAL CONDITIONS: Temp °F | Pressure mm Hg @ °C

METERS USED: TLV #1 #2 | OVA #1 #2

Coder _____

Date _____

TARGET CONC	BAG #	CONC IN SAMPLE GAS	SAMPLE GAS Time /100 ml(sec) 1st	2nd	3rd	ZERO AIR Time /100 ml(sec) 1st	2nd	3rd	SAMPLE READINGS TLV #1	#2	OVA #1	#2	AMBIENT TLV #1	#2	OVA #1	#2	SAMPLE GAS TUBE VOL

$$\left(\left(\frac{C_s}{p} - 1\right) \times t_a \times \frac{V_s}{V_a}\right) = t_s$$

C_s = Conc. in sample gas cylinder (ppm).
p = Target conc. (ppm).
t_a = Average time for air thru bubble meter (sec).
V_a = Volume of sample gas bubble meter.
V_s = Volume of zero air bubble meter.
t_s = Target time for sample gas thru bubble meter (sec).

Notes, Comments

The overall variance can be estimated from the standard formula for estimating the variance of a ratio from the variances of the numerator and denominator.[6] In this case, the overall coefficient of variation in the calculated concentration of standards prepared from gases was estimated to be ±13.7 percent.

3.4 INSTRUMENT SAMPLING PROCEDURES

The procedures used to obtain response data from the prepared standards were quite simple. A manifold was prepared from a "Y" connector and Teflon tubing to connect a sample bag to two instruments. Normally the two OVA's were read first, followed by the two TLV's. Readings were repeated as often as possible, as limited by the volume of sample remaining after taking the initial four readings. The instrument response data were recorded on the computer coded sheets previously presented as Tables 3-1 and 3-2.

The tubing manifold was flushed with zero-grade air between samples to reduce any cross contamination. At the completion of flushing, the zero-grade air was routed through the manifold to the instruments. The TLV's were electronically zeroed on this gas. The OVA reading was recorded as an "ambient" concentration which was subsequently subtracted from the next sample reading to yield a net response value for the sample gas. While this procedure was a worthwhile safeguard, the flushing alone seemed to be effective enough since no residual concentrations in excess of 10 ppmv were noted.

3.5 QUALITY ASSURANCE

Quality Assurance checks were run throughout the project. A standard gas was read at random intervals by each instrument in use. Generally, this standard was 533 ppmv methane in air but sometimes 7993 ppmv methane in air was also read. These readings were made independently of the routine calibrations. The data from these checks are summarized in Table 3-3.

TABLE 3-3. SUMMARY OF RANDOM CALIBRATION CHECKS USED FOR QUALITY ASSURANCE

Date	Time	Standard Concentration (ppmv)	OVA Readings (ppmv)	TLV Readings (ppmv)
3/11	0830*	7993	8000, 8000	-
	0830*	533	650, 700	-
	1535	533	650, 700	519, 498
3/12	0830	7993	7900, 8000	-
	0830	533	610, 720	-
	0905	533	610, 720	547, 533
3/13	0830	7993	7000, 7900	-
	0830	533	710, 690	-
	1010	533	710, 690	547, 533
	1620	533	640, 658	533, 519
3/14	0830	7993	8000, 8000	-
	0830	533	710, 710	-
	1100	533	710, 710	-
	1645	533	710, 690	533, 526
3/17	0830	7993	8000, 8000	-
	0830	533	720, 700	-
	1008	533	720, 700	-
3/18	0830	7993	6500, 8900	-
	0830	533	700, 700	-
3/19	0830	7993	9500, 8700	-
	0830	533	750, 850	-
	0952	533	620, 750	547, 533
	1625	533	830, 650	547, 547
	1625**	7993	8000, 8000	-
	1625**	533	620, 750	-

*The calibration checks done at 0830 are the daily routine calibrations. They are included in this table for comparison to the random calibration checks used for QA.

**Recalibrated.

TABLE 3-3. SUMMARY OF RANDOM CALIBRATION CHECKS USED FOR QUALITY ASSURANCE (continued)

Date	Time	Standard Concentration (ppmv)	OVA Readings (ppmv)	TLV Readings (ppmv)
3/20	0830	7993	9000, 8100	-
	0830	533	700, 750	-
	0900	533	700, 750	519, 505
	1700	533	730, 690	540, 526
3/21	0830	7993	7300, 8000	-
	0830	533	700, 700	-
	0900	533	700, 700	533, 533
3/24	0830	7993	7900, 8000	-
	0830	533	620, 690	-
	0910	533	620, 690	540, 533
	1720	533	710, 700	533, 519
3/25	0830	7993	8000, 8900	-
	0830	533	720, 700	-
	0855	533	720, 700	540, 533
3/26	0830	7993	9000, 8100	-
	0830	533	650, 700	-
	0915	533	650, 700	533, 533
3/27	0830	7993	7000, 8000	-
	0830	533	620, 700	-
	0927	533	620, 700	533, 533
	1645	533	890, 750	533, 526
3/28	0830	7993	6000, 7700	-
	0830	533	700, 710	-
	1117	533	700, 710	540, 533
4/1	0830	7993	7300, 7300	-
	0830	533	730, 720	-
	1153	533	730, 720	526, 519

TABLE 3-3. SUMMARY OF RANDOM CALIBRATION CHECKS USED FOR QUALITY ASSURANCE (continued)

Date	Time	Standard Concentration (ppmv)	OVA Readings (ppmv)	TLV Readings (ppmv)
4/2	0830	7993	9000, 7300	-
	0830	533	780, 720	-
	1415	533	780, 720	533, 540
	1700	533	620, 710	533, 526
4/3	0830	7993	8000, 8200	-
	0830	533	680, 780	-
	0900	533	680, 780	519, 505
	1715	533	630, 720	472, 526
4/4	0830	7993	8000, 8000	-
	0830	533	750, 700	-
	0910	533	750, 700	540, 526
4/7	0830	7993	8100, 7800	-
	0830	533	770, 700	-
	0900	533	770, 700	519, 526
	1300	533	670, 770	-
	1300*	7993	7800, 8000	-
4/8	0830	7993	10000, 9200	-
	0830	533	750, 710	-
	0855	533	750, 710	526
4/9	0830	7993	8000, 8000	-
	0830	533	710, 710	-
	1330	533	710, 710	-
4/10	0830	7993	8000, 8000	-
	0830	533	710, 720	-
	1000	533	710, 720	554

*Recalibrated.

TABLE 3-3. SUMMARY OF RANDOM CALIBRATION CHECKS USED FOR QUALITY ASSURANCE (continued)

Date	Time	Standard Concentration (ppmv)	OVA Readings (ppmv)	TLV Readings (ppmv)
4/11	0830	7993	8000, 7900	-
	0830	533	700, 710	-
	0915	533	700, 710	-
4/14	0830	7993	8000, 5200	-
	0830	533	670, 690	-
	1630	533	700, 700	519**
4/15	0830	7993	8500, 9200	-
	0830	533	700, 720	-
	0930	533	700, 720	527, 780
4/16	0830	7993	8900, 8900	-
	0830	533	780, 720	-
	0930	533	780, 720	567, 791
	1705	533	720, 800	-
4/17	0830	7993	7900, 8000	-
	0830	533	610, 750	-
	0925	533	610, 750	516, 780
	1700	533	610, 700	780
4/18	0830	7993	6300, 7500	-
	0830	533	710, 710	-
	1020	533	710, 710	770
4/21	0830	7993	7900, 8200	-
	0830	533	680, 750	-
	0905	533	680, 750	533, 770
4/22	0830	7993	6900, 8200	-
	0830	533	720, 720	-
	1010	533	720, 720	759

**Original TLV's down for repairs, two different TLV's used in subsequent testing.

TABLE 3-3. SUMMARY OF RANDOM CALIBRATION CHECKS USED FOR QUALITY ASSURANCE (continued)

Date	Time	Standard Concentration (ppmv)	OVA Readings (ppmv)	TLV Readings (ppmv)
4/23	0830	7993	8000, 8000	-
	0830	533	710, 730	-
	0900	533	710, 730	527, 759
4/24	0830	7993	7200, 8100	-
	0830	533	620, 710	-
	0930	533	620, 710	516, 747
4/25	0830	7993	8000, 8100	-
	0830	533	710, 710	-
	0940	533	710, 710	747
4/28	0830	7993	6900, 8000	-
	0830	533	690, 720	-
	1110	533	690, 720	738
4/29	0830	7993	7100, 8000	-
	0830	533	710, 720	-
	0925	533	710, 720	747
	1540	533	790, 720	717
4/30	0830	7993	7500, 8900	-
	0830	533	750, 750	-
	0945	533	750, 750	759
5/1	0830	7993	7800, 8200	-
	0830	533	750, 790	-
	0845	533	750, 790	749
5/2	0830	7993	8100, 8000	-
	0830	533	750, 600	-
	0915	533	710, 600	539, 738

TABLE 3-3. SUMMARY OF RANDOM CALIBRATION CHECKS USED FOR QUALITY ASSURANCE (continued)

Date	Time	Standard Concentration (ppmv)	OVA Readings (ppmv)	TLV Readings (ppmv)
5/5	0830	7993	7800, 8700	-
	0830	533	700, 720	-
	1010	533	700, 720	749
	1430	533	700, 750	759
8/18	0930	7993	8000	8000**
	0930	533	680	540
	1525	7993	8000	8100
	1525	533	700	530
8/19	1015	7993	8000	8200
	1015	533	700	515
8/21	1055	7993	8000	8100
	1055	533	630	530
	1645	7993	6800	7950
	1645	533	580	530
8/22	1300	7993	8000	7900
	1300	533	650	500
	1510	7993	8000	7950
	1510	533	680	480
8/25	1025	7993	8000	8000
	1025	533	700	520
	1530	7993	7900, 8000	7900
	1530	533	700, 600	525
8/26	0915	7993	8000, 8000	8000
	0915	533	700, 530	525
	1745	7993	8000, 8000	-
	1745	533	710, 550	-

**Changed TLV's.

TABLE 3-3. SUMMARY OF RANDOM CALIBRATION CHECKS USED FOR QUALITY ASSURANCE (continued)

Date	Time	Standard Concentration (ppmv)	OVA Readings (ppmv)	TLV Readings (ppmv)
8/27	0900	7993	8000, 8000	7950
	0900	533	620, 520	535
	1540	7993	8000, 8000	8050
	1540	533	600, 700	530
8/28	1010	7993	8000, 8000	8000
	1010	533	530, 700	533
8/29	1000	7993	8000, 8000	8000
	1000	533	550, 680	490

Quality Assurance on data transmittal was achieved by adherence to strict procedures. The data recorded on data sheets was keypunched and verified. A computer program added the new data to the permanent data base and printed out the card images, the raw data in tabular form, the routine calculations in tabular form, and a graphic presentation of the data. These computer outputs were returned to the experimenters for verification and anomaly checking. Any errors detected were corrected in the data base.

SECTION 4

DATA ANALYSIS

For this section, the following definitions apply. The actual concentration is the concentration of vapor in parts per million by volume (ppmv), as described under Test Procedures above. This is the calculated concentration in the bag. The instrument response is the reading (ppmv) obtained from the calibrated instrument as it samples the contents of the bag. The response factor is the number that when multiplied by the instrument response gives the actual concentration. That is:

$$C = (RF)\ (IR) \quad ,$$

so that

$$RF = C/(IR) \quad , \qquad (1)$$

where C = actual concentration (ppmv),

IR = instrument response (ppmv), and

RF = response factor.

In Equation (1), RF may be considered a function of C. If, for some chemical, the response factor RF is a constant over some useful range of actual concentrations C, then it would be justified to call this constant value the response factor for the particular chemical. The data collected in this study indicate that there is no single response factor for most chemicals.

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Depending on the chemical, the function (1) describes the response factor as an increasing or decreasing function of actual concentration in many cases. Some of the response factor functions appear to peak or trough within the range of concentrations tested. The variability or precision of measured response factors also sometimes varies considerably over the range of concentrations tested.

An average response factor would be justified if the variations in measured response factors from Equation (1) are due only to random errors of measurement:

$$RF = C/(IR) + \text{error} \ . \tag{2}$$

As discussed above, this does not appear to be the case. It appears that Equation (2) is not a very useful way to represent the data.

The equation

$$IR = B \cdot C + \text{error} \ , \tag{3}$$

where B is a coefficient, is an alternative model to (2) for the relationship between instrument response and actual concentration. This approach is more realistic since, in the experiments done here, the concentration, C, is measured with much greater precision than the instrument responses. Equation (3) may be fitted by least squares regression. The response factor then is estimated by

$$RF = 1/B \ .$$

There are several problems with this approach. As discussed above, a single response factor for all concentrations is not justifiable. Estimating the response factor as the reciprocal of a regression coefficient generates a bias that is not easily corrected for. Furthermore, a confidence interval for the estimate is not easy to construct.

Constant variance about the regression line is one assumption necessary for least squares regression estimation. The data collected in this study show greater variation in instrument response associated with higher concentrations. This is not unexpected but is another objection to fitting Equation (3) by least squares.

Transforming the response variable with a logarithmic function is a useful technique for homogenizing variance. Using a logarithmic transformation on both instrument response and actual concentration gives a fairly linear relationship as well as even variability. Thus, the relationship is

$$\ell n\ (IR) = a + b \cdot \ell n\ (C) + \text{error} \quad , \tag{4}$$

which is functionally equivalent to

$$IR = e^{a} \cdot C^{b} \quad ,$$

if the error is ignored. The regression coefficients a and b can be fitted by least squares using Equation (4). This provides a predictive equation for instrument response for a given concentration. The method also allows for estimating the precision of the prediction. This approach generates an empirical functional relationship between the actual concentration and the instrument response. A response factor at any particular actual concentration can be computed from (4) using this empirical relationship.

The following method gives the details of the method used to estimate the response factor at 10,000 ppmv with a 95 percent confidence interval. Let C_i, $i = 1, \ldots, n$, be the actual concentrations tested and IR_i, $i = 1, \ldots, n$, be the observed instrument responses where n is the number of experimental tests performed. Then the model

$$\ell n\ (IR_i) = a + b \cdot \ell n\ (C_i) + \text{error}_i$$

is fitted by least squares, where $error_i$ is the unknown measurement error associated with the i^{th} test.[7] In addition to the estimates $\hat{a}$ and $\hat{b}$ of the parameters a and b, the following quantities are also computed. The mean square error is calculated from

$$S_e^2 = \sum_{i=1}^{n} [\ell n\ (IR_i) - \hat{a} - \hat{b} \cdot \ell n\ (C_i)]^2/(n-2) \quad .$$

The mean of the logarithms of the actual concentrations is calculated from

$$\bar{x} = \sum_{i=1}^{n} \ell n\ (C_i)/n \quad .$$

The sum of squared deviations of the logarithms of the actual concentrations about their mean is calculated from

$$ss_x = \sum_{i=1}^{n} [\ell n\ (C_i) - \bar{x}]^2 \quad .$$

The logarithm of the instrument response at 10,000 ppmv is estimated by

$$LIR_{10,000} = a + b \cdot \ell n\ (10,000) \quad ,$$

and upper and lower 95 percent confidence limits in the logarithmic scale are estimated by

$$LC_U = LIR_{10,000} + t \cdot S_{IR10000} \quad ,$$

$$LC_L = LIR_{10,000} - t \cdot S_{IR10000} \quad ,$$

where t is the tabulated Student's t with n-2 degrees of freedom for 95 percent confidence, and

$$S_{IR10000} = \sqrt{S_e^2 \cdot [(1/n) + (\ell n\ 10{,}000 - \bar{x})^2/SS_x]} \quad .$$

Conversion back to the data scale from the logarithmic scale introduces a bias. The bias correction is approximately $S_e^2/2$.[8] Thus the estimated instrument response at 10,000 ppmv is

$$IR_{10,000} = \exp\ (LIR_{10,000} + S_e^2/2)$$

and the corresponding 95 percent confidence limits are

$$CL_L = \exp\ (LCI_L + S_e^2/2)$$

$$CL_U = \exp\ (LCI_U + S_e^2/2)$$

Therefore, the response factor at 10,000 ppmv is estimated by

$$RF_{10,000} = 10{,}000/IR_{10,000} \quad ,$$

and the 95 percent confidence interval by

$$(10{,}000/CL_U,\ 10{,}000/CL_L) \quad .$$

Note that the limits reverse order by this transformation. No attempt is made to account for bias introduced by this second transformation. The values of $\hat{a}$, $\hat{b}$, n, S_e, SS_x, and $\bar{x}$ necessary for performing these computations at any desired actual concentration are presented in Section 5, Tables 5-169 and 5-170.

In summary, this procedure amounts to estimating the instrument response to a 10,000 ppmv concentration by use of a fitted regression line. The response factor at 10,000 ppmv is then calculated from this estimated response.

If an unknown concentration is near 10,000 ppmv, then application of the 10,000 ppmv response factor to the instrument response will give roughly the correct concentration. Higher or lower concentrations will be estimated inaccurately by this method; however, they will be estimated as being higher or lower than 10,000 ppmv correctly.

For most of the chemicals tested in this survey, 10,000 ppmv is outside the range of tested concentrations. This fact is reflected in the confidence intervals which widen as the range of the data is exceeded.

Besides the statistical effects just noted, there are physical limitations. The instrument response may not continue to follow the projected linear trend (logarithmic scale) beyond the range of the data. It may not even be possible to achieve a concentration of 10,000 ppmv with the chemical in question. Neither the estimates nor confidence intervals reflect these limitations.

SECTION 5

DETAILED RESULTS

The results of the response factor work for 168 chemicals are summarized in Section 2, with the presentation of a single response factor estimate at 10,000 ppmv. This section will present the actual data on which that estimate is based. There are two sheets for each chemical. The first sheet is a tabular representation of the actual concentrations and the instrument response factors, and includes both weighted mean values and individual instrument response factors. The second sheet presents two graphs of instrument response vs. actual concentration, one for the OVA and one for the TLV. These data are presented as Tables 5-1 through 5-168, and Figures 5-1 through 5-168.

In Section 4, an equation was presented which can be used to calculate the response factors and the 95 percent confidence levels for each chemical at a concentration other than 10,000 ppmv. Table 5-169 gives the values for calculating the OVA response factors and the data for the TLV are presented in Table 5-170.

TABLE 5-1

RESPONSE FACTOR SUMMARY

ACETIC ACID

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	49	62	55	12.20	4.55	6	7.66	3.01	3	16.75	6.95	3						
200	208	208	208	2.08		1							2.08		1			
500	418	541	498	4.85	0.69	6	4.16	0.70	3	5.54	2.24	3						
1500	1564	1564	1564	1.60		1							1.60		1			
5000	5414	5414	5414	1.84	0.03	2	1.81		1	1.87		1						
8000	8568	8709	8641	3.38	0.60	7	3.34	0.67	3	4.05	1.62	3	1.47		1			
OVERALL MEANS				5.80	0.05	23	4.73	1.06	10	8.09	2.72	10	1.71	0.19	3			

ESTIMATED AT 10,000 PPMV 1.83

95 % CONFIDENCE INTERVAL : (1.17, 2.87)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
50	49	62	55	0.90	0.14	5	1.07	0.54	2	0.78	0.24	3						
200	208	208	208	2.31		1				2.31		1						
500	418	541	498	2.41	0.41	5	2.91	0.13	2	2.07	0.33	3						
1500	1564	1564	1564	4.53		1				4.53		1						
5000	5414	5414	5414	6.64	2.57	2	9.21		1	4.06		1						
8000	8568	8709	8641	5.60	1.23	6	7.34	2.45	2	4.72	1.14	4						
OVERALL MEANS				3.51	0.04	20	4.55	1.38	7	2.95	0.56	13						

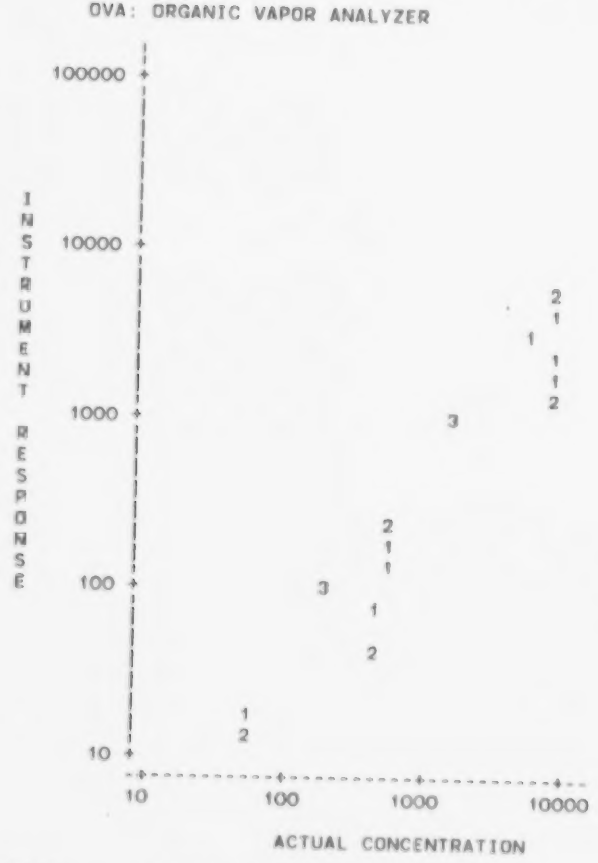
ESTIMATED AT 10,000 PPMV 5.70

95 % CONFIDENCE INTERVAL : (4.16, 7.81)

Figure 5-1

INSTRUMENT RESPONSE VS CONCENTRATION

ACETIC ACID



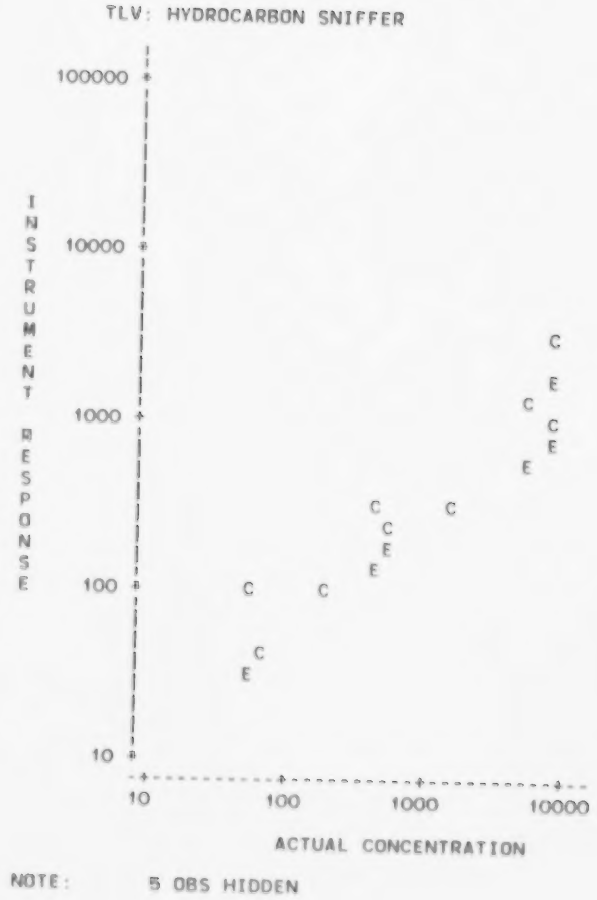


TABLE 5-2

RESPONSE FACTOR SUMMARY

ACETIC ANHYDRIDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	212	212	212	1.01	0.03	2	0.98		1	1.05		1						
1500	1507	1507	1507	1.23	0.15	2	1.08		1	1.38		1						
4000	3853	3853	3853	1.24	0.00	2	1.24		1	1.24		1						
		OVERALL MEANS		1.16	0.01	6	1.10	0.08	3	1.22	0.10	3						

ESTIMATED AT 10,000 PPMV 1.36

95 % CONFIDENCE INTERVAL : (1.12, 1.65)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	212	212	212	0.59		1										0.59		1
1500	1507	1507	1507	1.53		1										1.53		1
4000	3853	3853	3853	1.83		1										1.83		1
		OVERALL MEANS		1.32		3										1.32	0.37	3

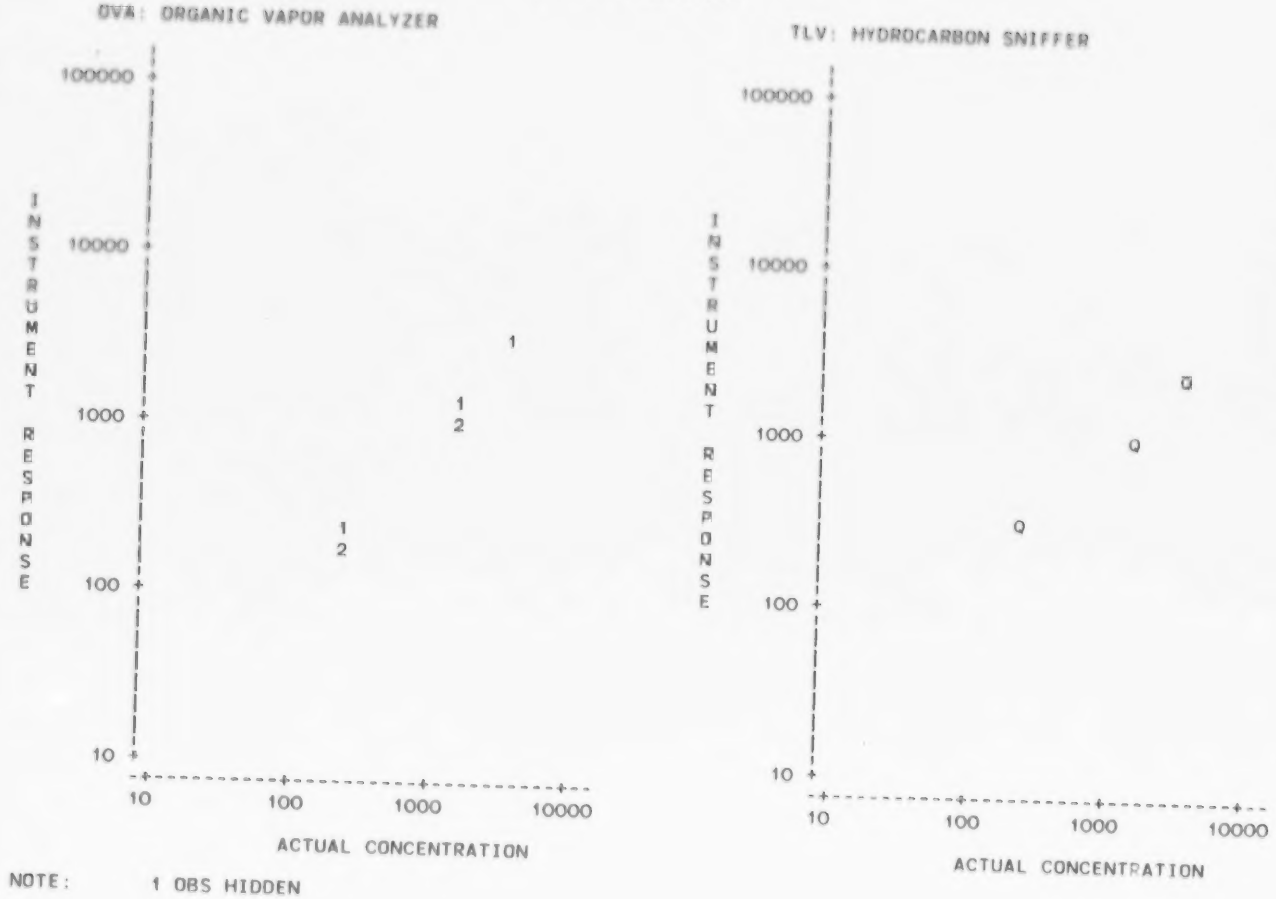
ESTIMATED AT 10,000 PPMV 2.89

95 % CONFIDENCE INTERVAL : (1.62, 5.14)

Figure 5-2

INSTRUMENT RESPONSE VS CONCENTRATION

ACETIC ANHYDRIDE



NOTE: 1 OBS HIDDEN

TABLE 5-3

RESPONSE FACTOR SUMMARY

ACETONE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	55	58	57	1.33	0.08	4	1.41	0.44	2	1.26	0.42	2						
500	536	556	546	1.07	0.15	4	1.22	0.66	2	0.92	0.47	2						
4000	4117	4117	4117	1.33	0.05	2	1.37		1	1.28		1						
8000	8558	8649	8603	0.82	0.13	4	0.95	0.02	2	0.69	0.00	2						
		OVERALL MEANS		1.11	0.01	14	1.22	0.19	7	1.00	0.17	7						

ESTIMATED AT 10,000 PPMV 0.79 95 % CONFIDENCE INTERVAL : (0.53, 1.19)

TLV INSTRUMENTS

RESPONSE FACTORS

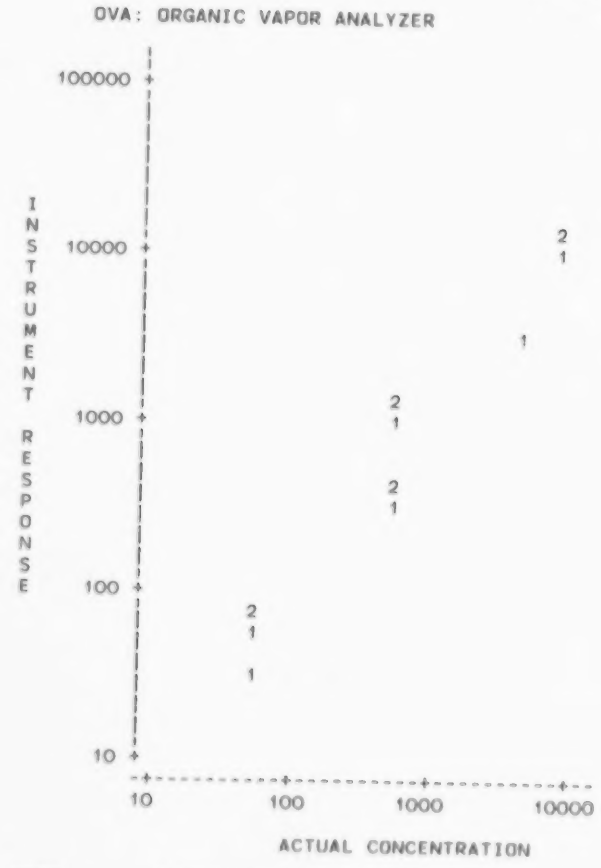
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
50	55	58	57	1.10	0.18	4	1.28	0.12	2	0.92	0.15	2						
500	536	556	546	2.27	1.07	4	1.21	0.30	2	3.34	1.61	2						
4000	4117	4117	4117	1.25	0.12	2	1.37		1	1.13		1						
8000	8558	8649	8603	1.20	0.13	4	1.33	0.03	2	1.07	0.01	2						
		OVERALL MEANS		1.48	0.01	14	1.28	0.08	7	1.68	0.56	7						

ESTIMATED AT 10,000 PPMV 1.22 95 % CONFIDENCE INTERVAL : (0.81, 1.83)

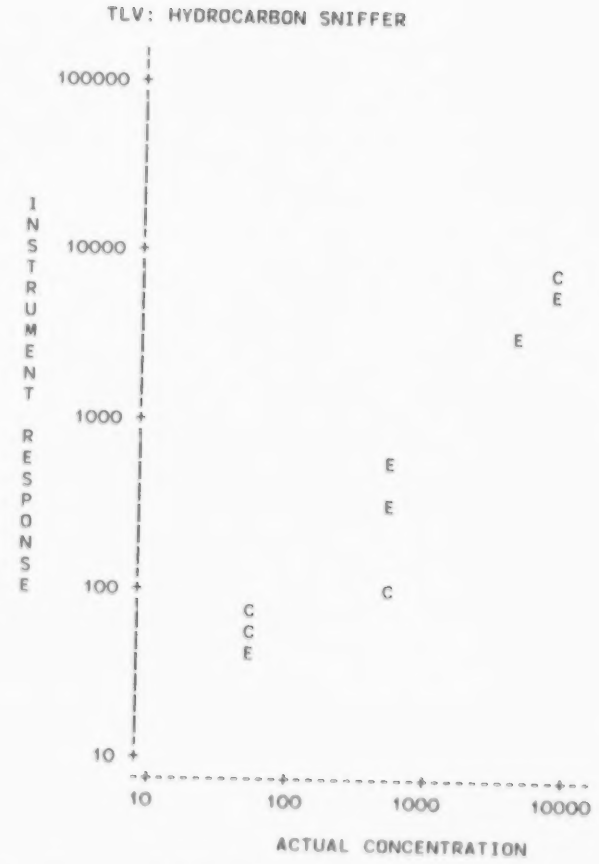
Figure 5-3

INSTRUMENT RESPONSE VS CONCENTRATION

ACETONE



NOTE: 4 OBS HIDDEN



NOTE: 5 OBS HIDDEN

TABLE 5-4

RESPONSE FACTOR SUMMARY

ACETONE CYANOHYDRIN

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	231	231	231	3.18	0.48	2
400	402	402	402	3.56	0.54	2
660	650	650	650	3.24	0.57	2
		OVERALL MEANS		3.33	0.09	6
		ESTIMATED AT 10,000 PPMV		3.42		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
2.70		1	3.66		1						
3.02		1	4.10		1						
2.68		1	3.81		1						
2.80	0.11	3	3.86	0.13	3						

95 % CONFIDENCE INTERVAL : (0.70, 16.83)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	231	231	231	2.33	0.22	2
400	402	402	402	3.03	0.64	2
660	650	650	650	3.31	0.66	2
		OVERALL MEANS		2.89	0.08	6
		ESTIMATED AT 10,000 PPMV		7.84		

RESPONSE FACTORS

TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
2.56		1	2.11		1						
3.67		1	2.39		1						
3.96		1	2.65		1						
3.40	0.43	3	2.38	0.16	3						

95 % CONFIDENCE INTERVAL : (1.40, 43.78)

Figure 5-4

INSTRUMENT RESPONSE VS CONCENTRATION

ACETONE CYANOHYDRIN

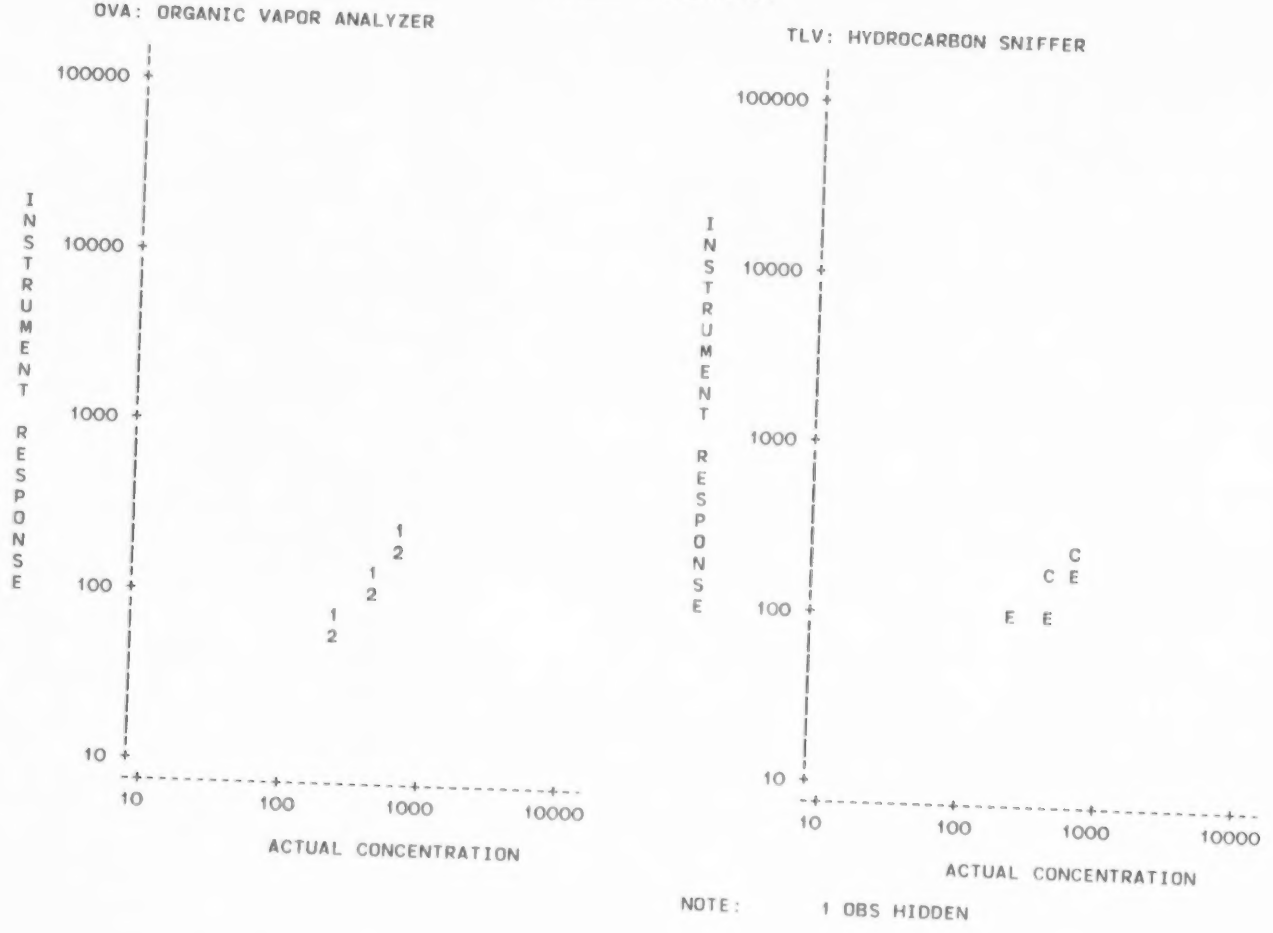


TABLE 5-5

RESPONSE FACTOR SUMMARY

ACETONITRILE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	226	226	226	1.34	0.10	2	1.44		1	1.24		1						
1500	1515	1515	1515	1.16	0.03	2	1.12		1	1.19		1						
8000	7773	7773	7773	0.95	0.01	2	0.95		1	0.96		1						
		OVERALL MEANS		1.15	0.00	6	1.17	0.14	3	1.13	0.09	3						

ESTIMATED AT 10,000 PPMV 0.94 95 % CONFIDENCE INTERVAL : (0.85, 1.05)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	226	226	226	1.06	0.08	2	1.14		1	0.98		1						
1500	1515	1515	1515	1.00	0.03	2	0.96		1	1.03		1						
8000	7773	7773	7773	1.23	0.10	2	1.32		1	1.13		1						
		OVERALL MEANS		1.09	0.01	6	1.14	0.10	3	1.04	0.05	3						

ESTIMATED AT 10,000 PPMV 1.17 95 % CONFIDENCE INTERVAL : (0.96, 1.42)

Figure 5-5

INSTRUMENT RESPONSE VS CONCENTRATION

ACETONITRILE

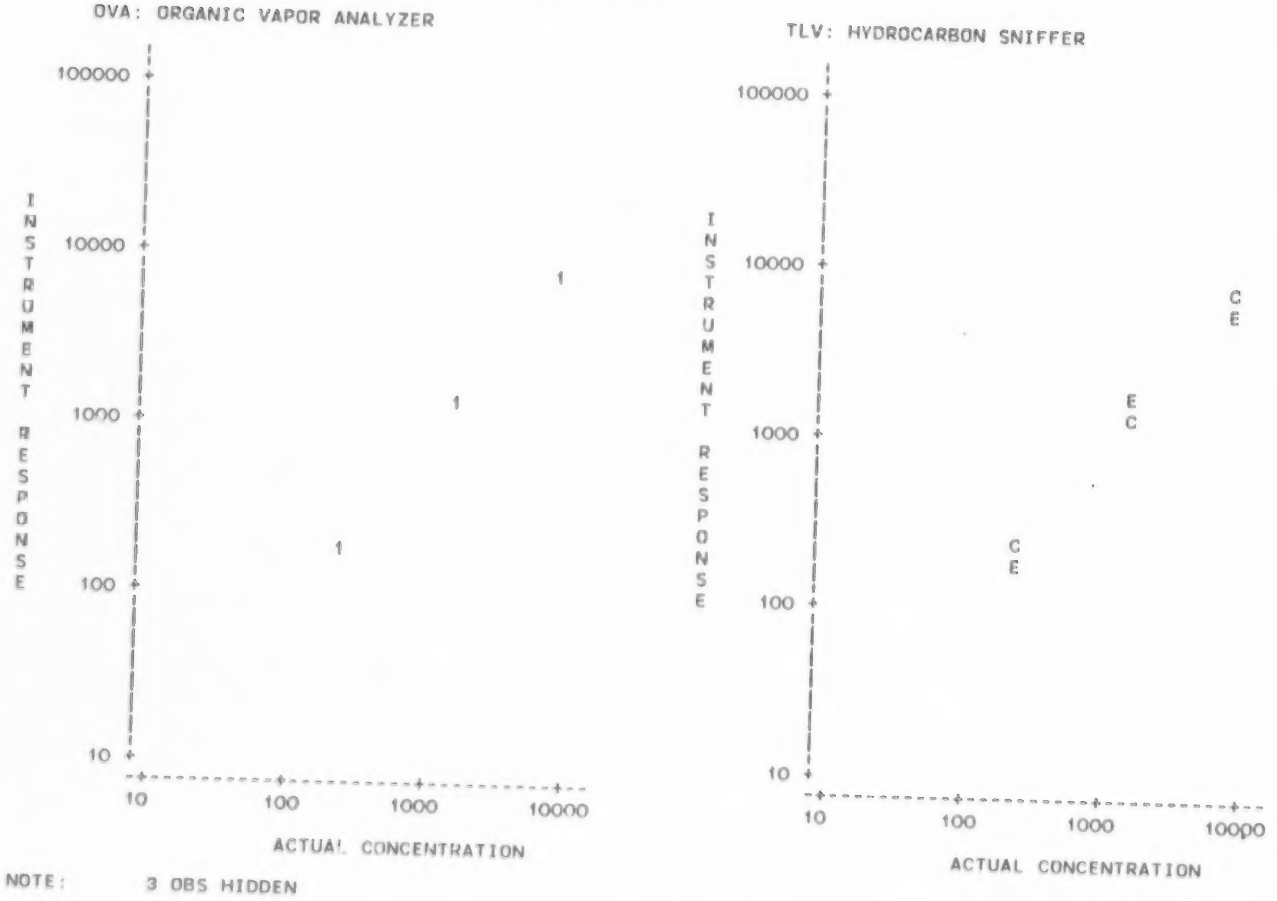


TABLE 5-6

RESPONSE FACTOR SUMMARY

ACETOPHENONE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
50	47	50	48	7.19	1.48	4
500	517	546	531	6.47	0.64	4
5000	5207	5207	5207	15.01	1.52	2
8000	8675	8877	8776	27.83	0.25	4
OVERALL MEANS				14.00	0.06	14

ESTIMATED AT 10,000 PPMV 10.98

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
5.71	2.16	2	8.66	3.14	2						
5.82	1.16	2	7.11	1.36	2						
13.49		1	16.53		1						
27.58	23.2	2	28.08	22.6	2						
13.10	6.40	7	14.89	6.17	7						

95 % CONFIDENCE INTERVAL : (5.56,21.68)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
50	47	50	48	2.11	0.35	4
500	517	546	531	12.53	3.36	4
5000	5207	5207	5207	30.30	14.5	2
8000	8675	8877	8776	61.93	8.37	4
OVERALL MEANS				26.20	0.39	14

ESTIMATED AT 10,000 PPMV 54.86

RESPONSE FACTORS

TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
2.45	0.15	2	1.76	0.22	2						
15.89	2.11	2	9.17	2.34	2						
44.81		1	15.79		1						
70.30	3.50	2	53.56	12.3	2						
31.72	11.3	7	20.68	9.11	7						

95 % CONFIDENCE INTERVAL : (38.35,78.48)

Figure 5-6

INSTRUMENT RESPONSE VS CONCENTRATION

ACETOPHENONE

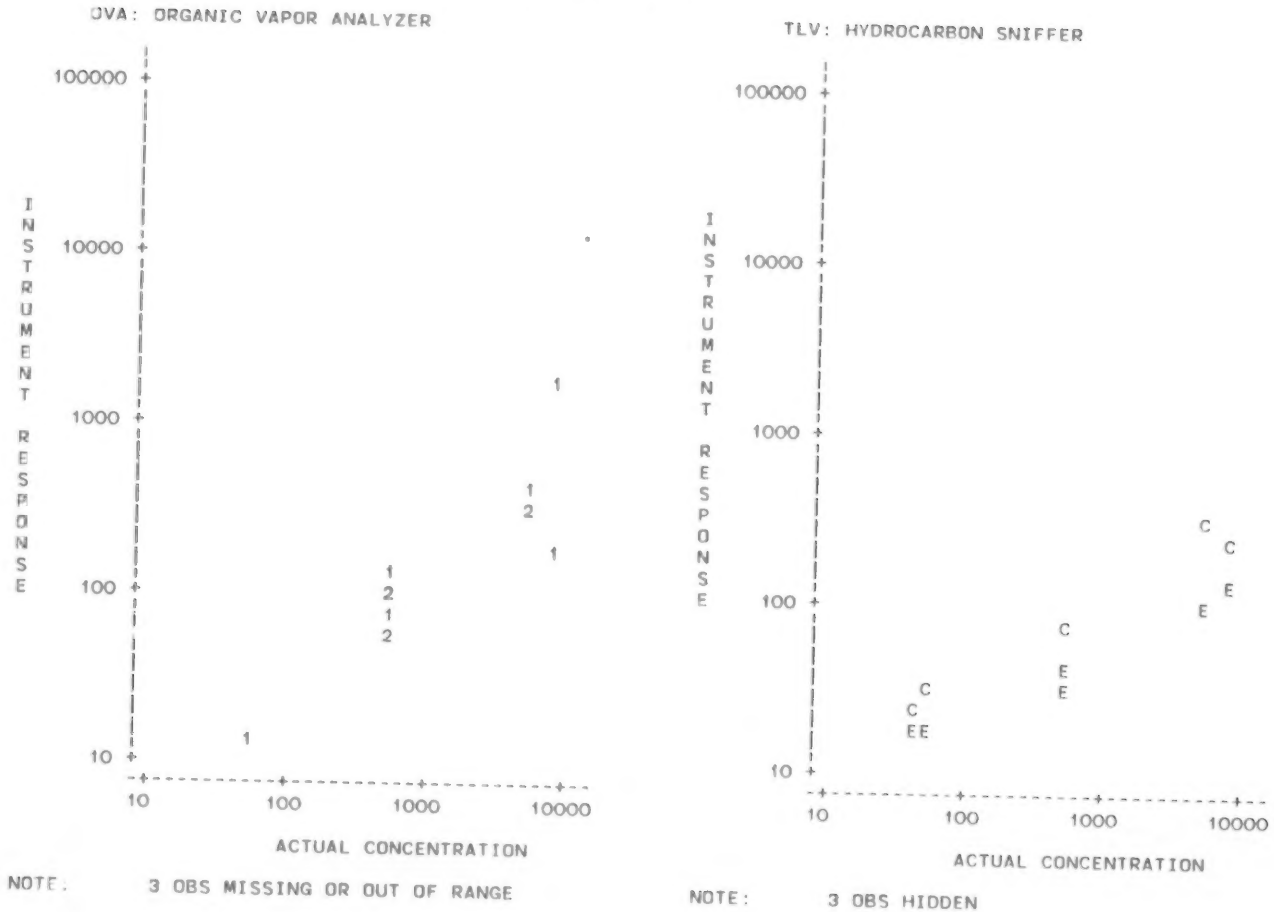


TABLE 5-7

RESPONSE FACTOR SUMMARY

ACETYL CHLORIDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	192	192	192	1.75	0.09	2	1.66		1	1.83		1						
1500	1464	1464	1464	1.86	0.15	2	1.71		1	2.01		1						
8000	8875	8875	8875	2.00	0.11	2	1.89		1	2.12		1						
		OVERALL MEANS		1.87	0.02	6	1.75	0.07	3	1.98	0.08	3						

ESTIMATED AT 10,000 PPMV 1.99

95 % CONFIDENCE INTERVAL : (1.76, 2.26)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	192	192	192	2.19	0.47	2	2.66		1	1.71		1						
1500	1464	1464	1464	2.62	0.44	2	3.06		1	2.17		1						
8000	8875	8875	8875	2.57	0.31	2	2.89		1	2.26		1						
		OVERALL MEANS		2.46	0.07	6	2.87	0.12	3	2.05	0.17	3						

ESTIMATED AT 10,000 PPMV 2.59

95 % CONFIDENCE INTERVAL : (1.81, 3.71)

Figure 5-7

INSTRUMENT RESPONSE VS CONCENTRATION

ACETYL CHLORIDE

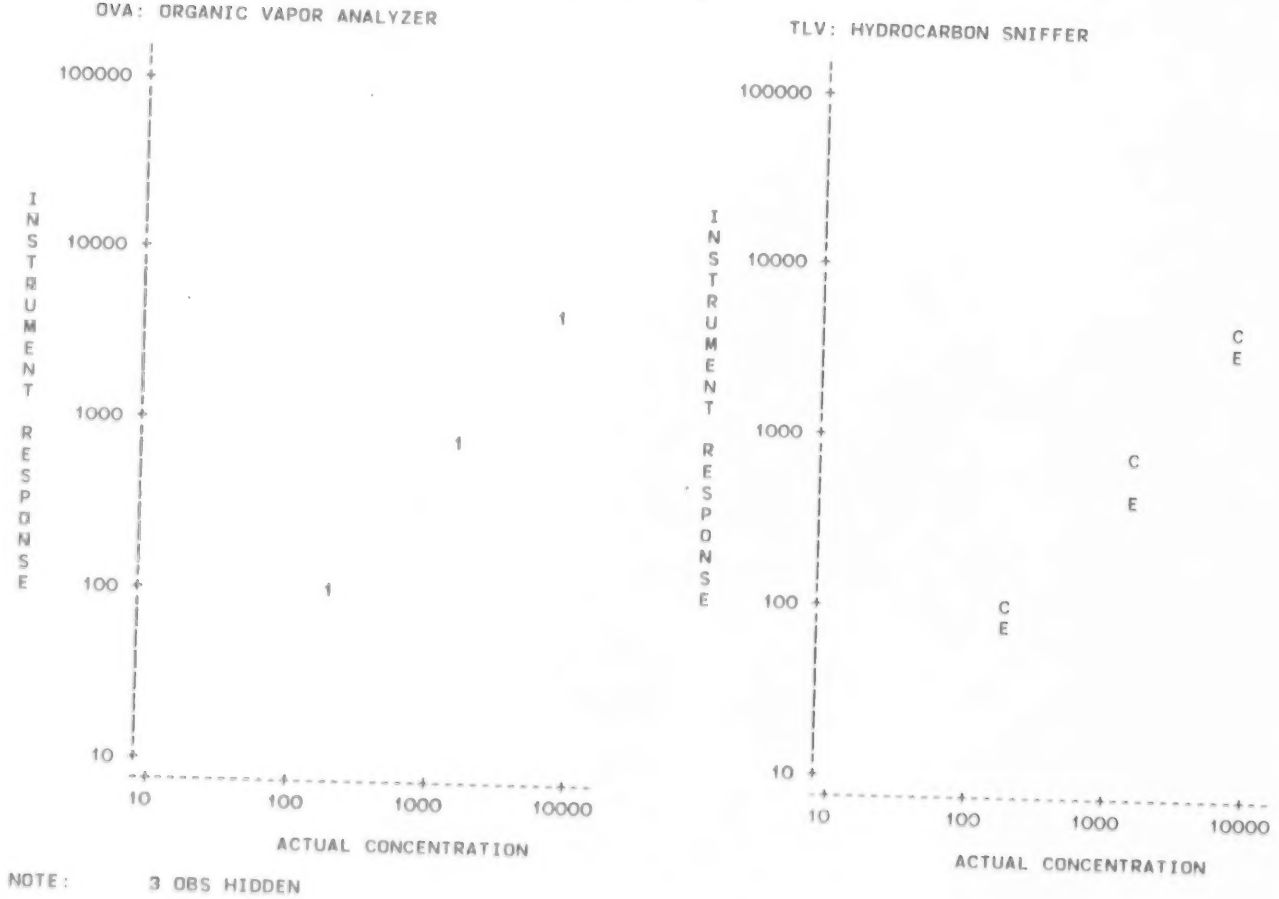


TABLE 5-8

RESPONSE FACTOR SUMMARY

ACETYL-1-PROPANOL,3-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS — OVA METERS 1080 MEAN	SE	N	2254 MEAN	SE	N	2159 MEAN	SE	N	1813 MEAN	SE	N
50	55	57	56	2.17	0.08	4	2.09	0.67	2	2.25	0.66	2						
500	544	559	552	2.72	0.09	4	2.81	0.82	2	2.63	1.01	2						
8000	8461	8500	8481	14.24	1.14	4	15.37	2.48	2	13.10	2.48	2						
		OVERALL MEANS		6.38	0.03	12	6.76	2.81	6	5.99	2.36	6						

ESTIMATED AT 10,000 PPMV 10.87

95 % CONFIDENCE INTERVAL : (6.58,17.95)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS — TLV METERS 7E MEAN	SE	N	7C MEAN	SE	N	7M MEAN	SE	N	7Q MEAN	SE	N
50	55	57	56	1.94	0.41	4	2.36	0.17	2	1.53	0.26	2						
500	544	559	552	4.90	1.62	4	6.52	2.43	2	3.28	1.39	2						
8000	8461	8500	8481	38.78	20.4	4	59.21	2.69	2	18.34	3.20	2						
		OVERALL MEANS		15.21	0.62	12	22.70	11.6	6	7.72	3.49	6						

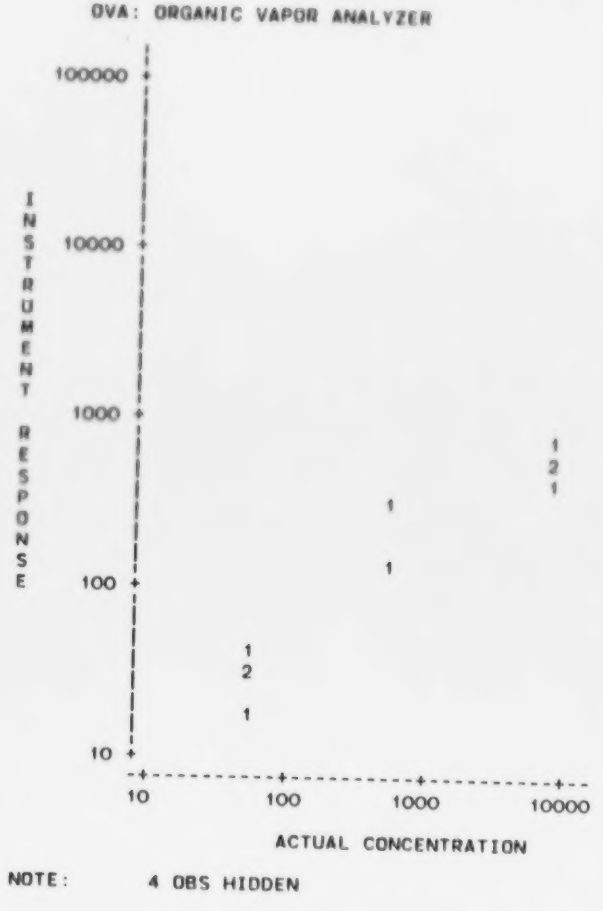
ESTIMATED AT 10,000 PPMV 25.81

95 % CONFIDENCE INTERVAL : (13.70,48.63)

Figure 5-8

INSTRUMENT RESPONSE VS CONCENTRATION

ACETYL-1-PROPANOL,3-



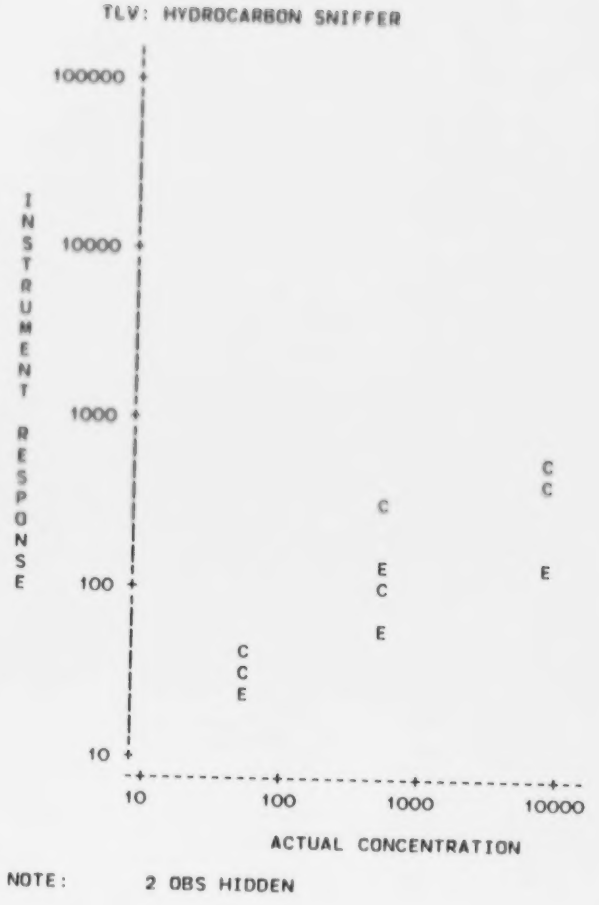


TABLE 5-9

RESPONSE FACTOR SUMMARY

ACETYLENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1000	904	904	904	0.43	0.00	2	0.43		1	0.43		1						
2000	1870	1870	1870	0.39	0.00	2	0.39		1	0.40		1						
3000	2971	2971	2971	0.41	0.01	2	0.40		1	0.42		1						
5000	4969	4969	4969															
17E3	17E3	17E3	17E3															
OVERALL MEANS				0.41	0.00	6	0.41	0.01	3	0.42	0.01	3						

ESTIMATED AT 10,000 PPMV 0.37

95 % CONFIDENCE INTERVAL : (0.32, 0.43)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
1000	904	904	904	2.78		1										2.78		1
2000	1870	1870	1870	4.95		1										4.95		1
3000	2971	2971	2971	6.15		1										6.15		1
5000	4969	4969	4969	8.45		1										8.45		1
17E3	17E3	17E3	17E3	15.45		1										15.45		1
OVERALL MEANS				7.56		5										7.56	2.18	5

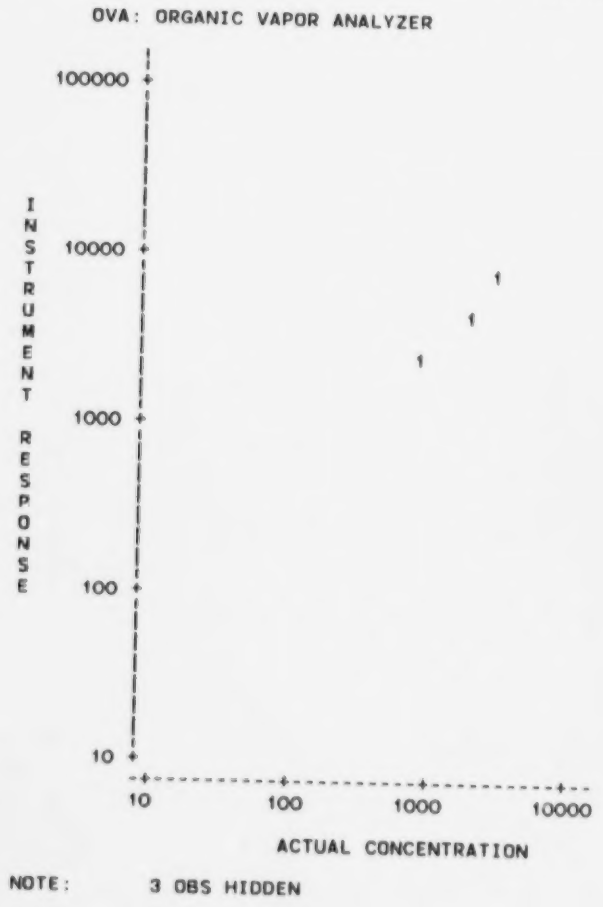
ESTIMATED AT 10,000 PPMV 11.95

95 % CONFIDENCE INTERVAL : (10.41,13.73)

Figure 5-9

INSTRUMENT RESPONSE VS CONCENTRATION

ACETYLENE



NOTE: 3 OBS HIDDEN

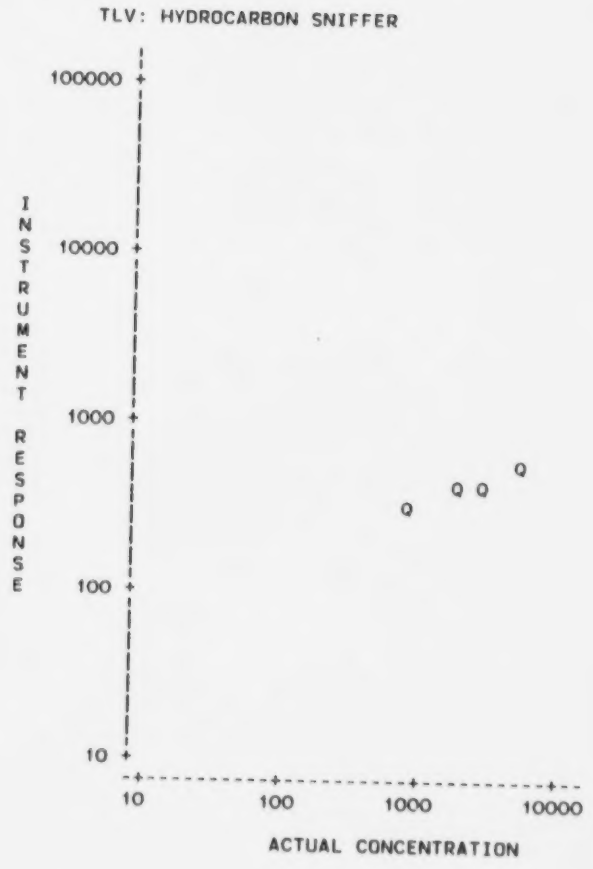


TABLE 5-10

RESPONSE FACTOR SUMMARY

ACRYLIC ACID

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	263	263	263	4.97	0.51	2	4.46		1	5.48		1						
1500	1539	1539	1539	4.58	0.47	2	4.10		1	5.05		1						
8000	8365	8365	8365	4.80	0.14	2	4.66		1	4.94		1						
		OVERALL MEANS		4.78	0.06	6	4.41	0.16	3	5.15	0.17	3						

ESTIMATED AT 10,000 PPMV 4.65

95 % CONFIDENCE INTERVAL : (3.85, 5.61)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	263	263	263	4.05	0.64	2	4.69		1	3.41		1						
1500	1539	1539	1539	18.72	8.74	2	27.46		1	9.97		1						
8000	8365	8365	8365	152.3	139	2	291.4		1	13.25		1						
		OVERALL MEANS		58.36	8.25	6	107.9	92	3	8.88	2.89	3						

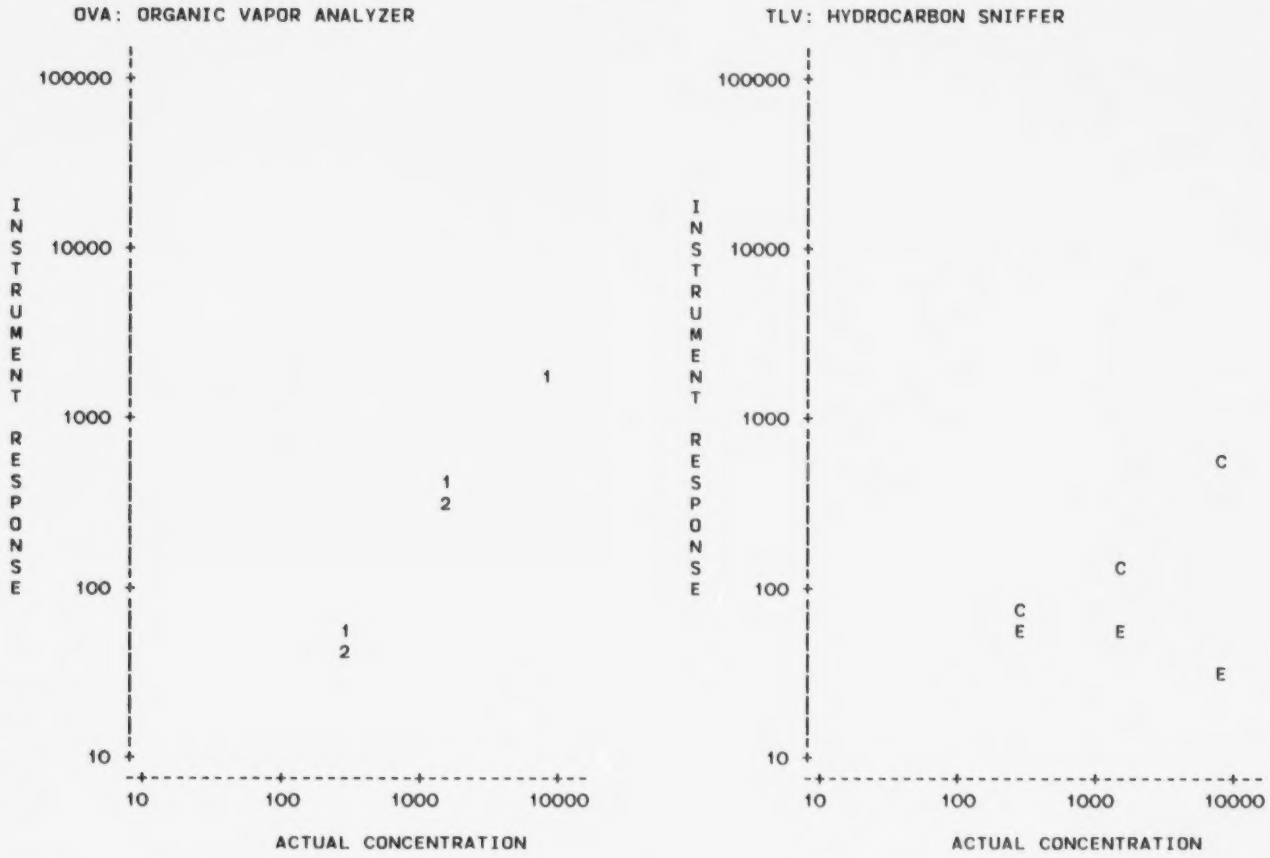
ESTIMATED AT 10,000 PPMV 36.95

95 % CONFIDENCE INTERVAL : (5.34,255.7)

Figure 5-10

INSTRUMENT RESPONSE VS CONCENTRATION

ACRYLIC ACID



NOTE: 1 OBS HIDDEN

TABLE 5-11

RESPONSE FACTOR SUMMARY

ACRYLONITRILE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	205	205	205	1.18	0.05	2	1.13		1	1.23		1						
1500	1416	1416	1416	1.25	0.04	2	1.21		1	1.29		1						
8000	8804	8804	8804	0.92	0.04	2	0.88		1	0.96		1						
		OVERALL MEANS		1.12	0.01	6	1.07	0.10	3	1.16	0.10	3						

ESTIMATED AT 10,000 PPMV 0.96 95 % CONFIDENCE INTERVAL : (0.79, 1.17)

TLV INSTRUMENTS

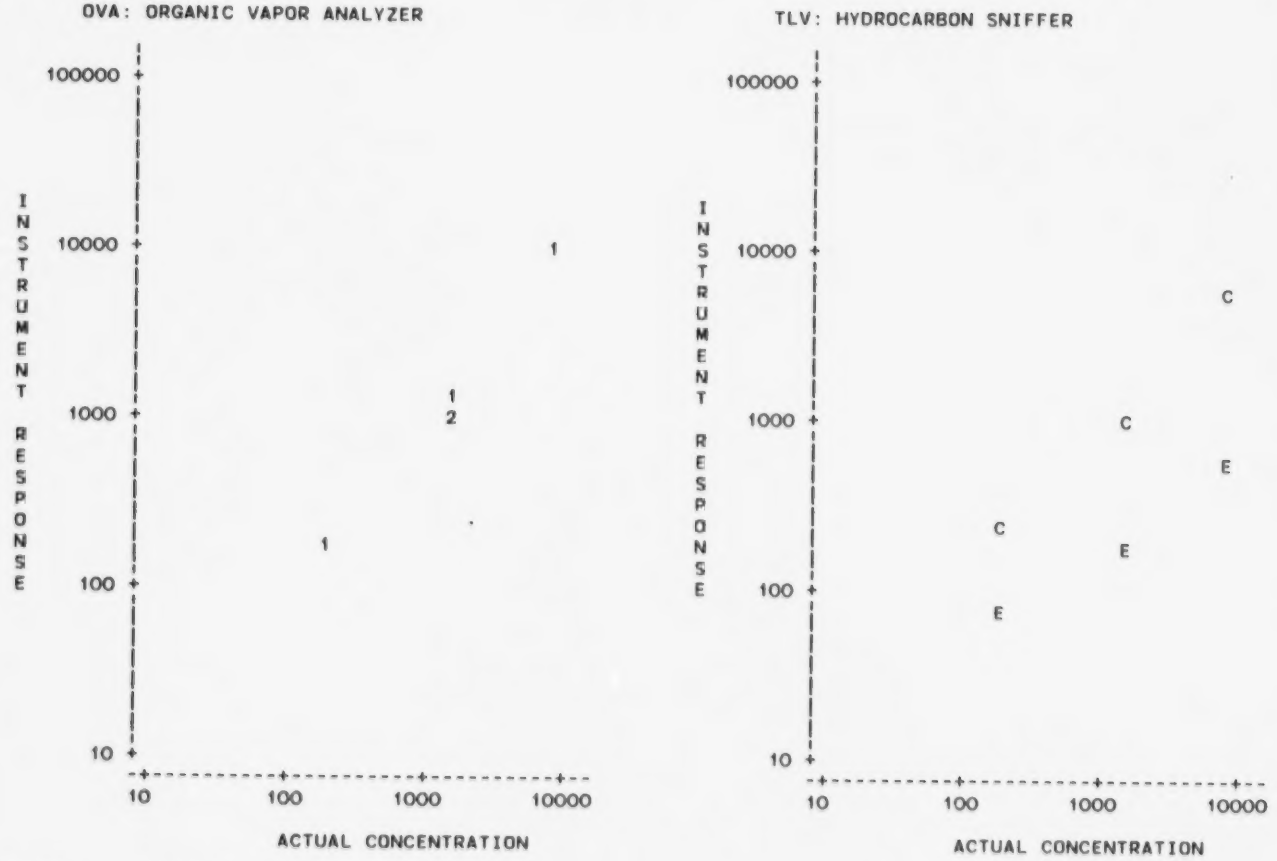
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	205	205	205	1.68	0.74	2	2.42		1	0.94		1						
1500	1416	1416	1416	4.36	3.04	2	7.40		1	1.33		1						
8000	8804	8804	8804	8.16	6.81	2	14.98		1	1.35		1						
		OVERALL MEANS		4.74	0.59	6	8.26	3.65	3	1.21	0.13	3						

ESTIMATED AT 10,000 PPMV 2.70 95 % CONFIDENCE INTERVAL : (0.44,16.36)

Figure 5-11

INSTRUMENT RESPONSE VS CONCENTRATION

ACRYLONITRILE



NOTE: 2 OBS HIDDEN

TABLE 5-12

RESPONSE FACTOR SUMMARY

ALLENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
1000	802	802	802	1.38	0.01	2	1.39		1	1.37		1						
4000	3968	3968	3968	0.82	0.01	2	0.81		1	0.83		1						
6000	5916	5916	5916	0.63	0.01	2	0.62		1	0.64		1						
15E3	15E3	15E3	15E3															
OVERALL MEANS				0.94	0.00	6	0.94	0.23	3	0.95	0.22	3						

ESTIMATED AT 10,000 PPMV 0.55

95 % CONFIDENCE INTERVAL : (0.49, 0.61)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
1000	802	802	802	2.39		1										2.39		1
4000	3968	3968	3968	4.29		1										4.29		1
6000	5916	5916	5916	4.58		1										4.58		1
15E3	15E3	15E3	15E3	6.80		1										6.80		1
OVERALL MEANS				4.52		4										4.52	0.90	4

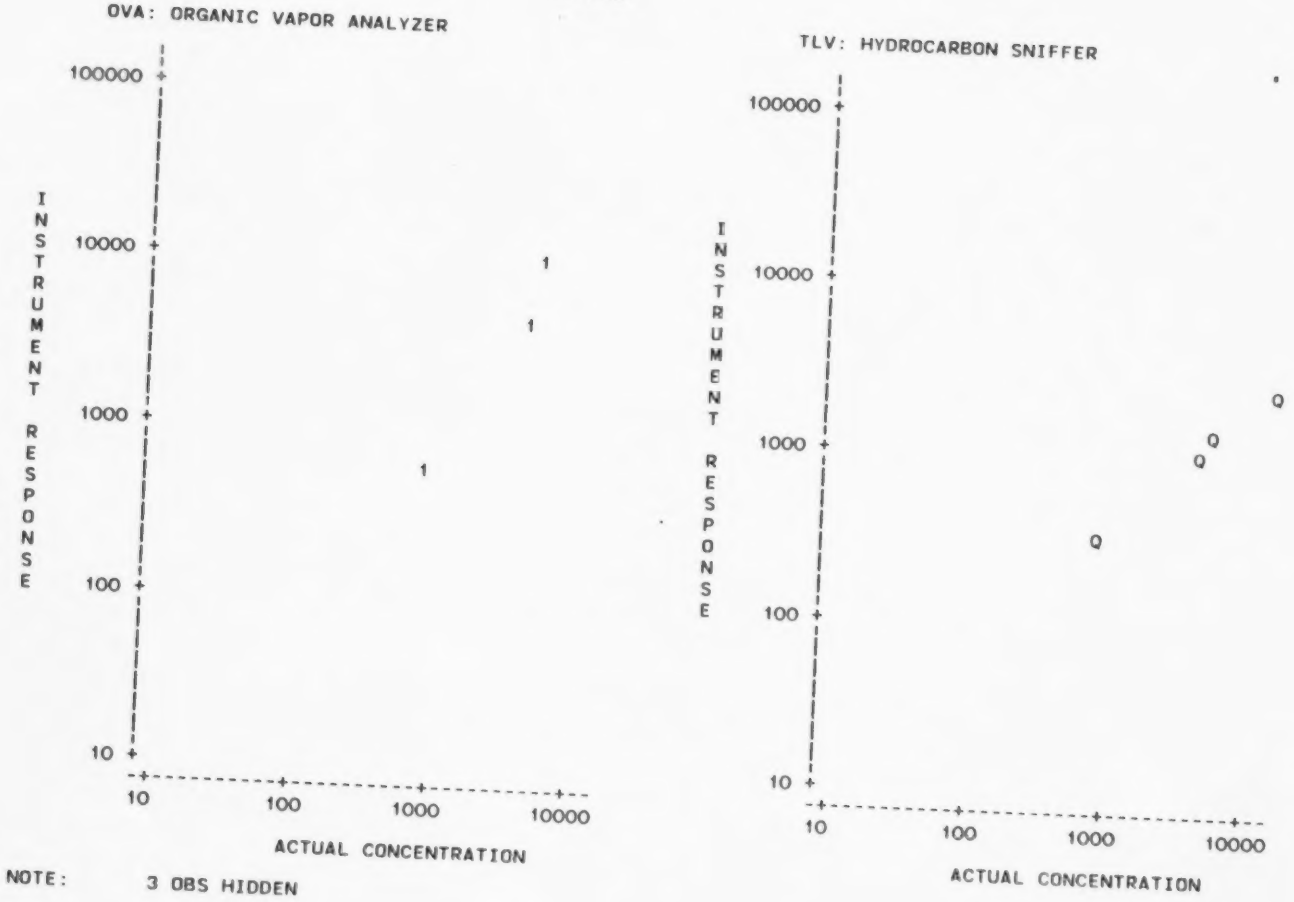
ESTIMATED AT 10,000 PPMV 5.78

95 % CONFIDENCE INTERVAL : (5.36, 6.24)

Figure 5-12

INSTRUMENT RESPONSE VS CONCENTRATION

ALLENE



NOTE: 3 OBS HIDDEN

TABLE 5-13

RESPONSE FACTOR SUMMARY

ALLYL ALCOHOL

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	201	201	201	4.11	0.25	2	4.37		1	3.86		1						
1500	1575	1575	1575	2.45	0.19	2	2.64		1	2.27		1						
8000	8156	8156	8156	0.93	0.03	2	0.96		1	0.90		1						
		OVERALL MEANS		2.50	0.03	6	2.66	0.98	3	2.34	0.86	3						

ESTIMATED AT 10,000 PPMV 0.94 95 % CONFIDENCE INTERVAL : (0.69, 1.30)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	201	201	201															
1500	1575	1575	1575															
8000	8156	8156	8156															
		OVERALL MEANS																

ESTIMATED AT 10,000 PPMV 95 % CONFIDENCE INTERVAL : (,)

Figure 5-13

INSTRUMENT RESPONSE VS CONCENTRATION

ALLYL ALCOHOL

OVA: ORGANIC VAPOR ANALYZER

TLV: HYDROCARBON SNIFFER

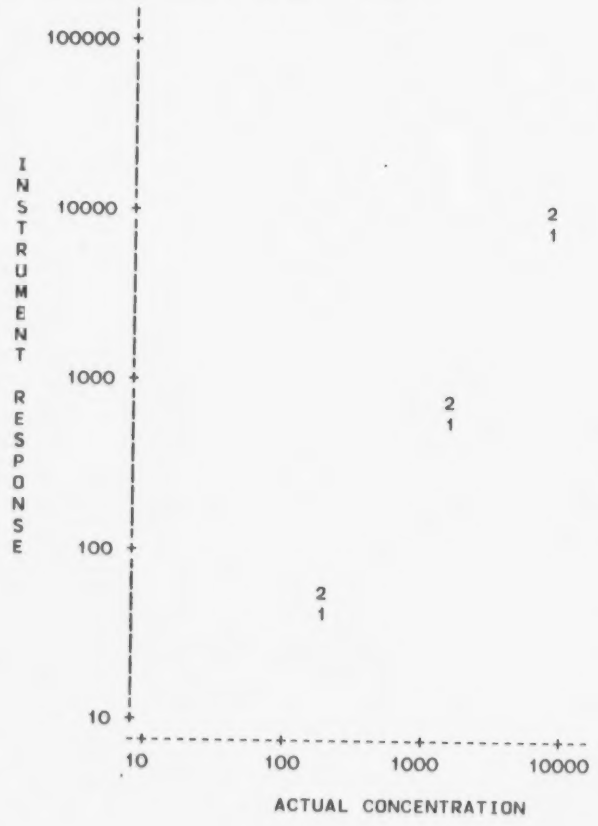


TABLE 5-14

RESPONSE FACTOR SUMMARY

AMYL ALCOHOL,N-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	223	223	223	2.19	0.06	2	2.12		1	2.25		1						
1000	1051	1051	1051	1.25	0.14	2	1.11		1	1.39		1						
2000	2165	2165	2165	1.16	0.12	2	1.03		1	1.28		1						
		OVERALL MEANS		1.53	0.02	6	1.42	0.35	3	1.64	0.31	3						

ESTIMATED AT 10,000 PPMV 0.69 95 % CONFIDENCE INTERVAL : (0.47, 1.00)

TLV INSTRUMENTS

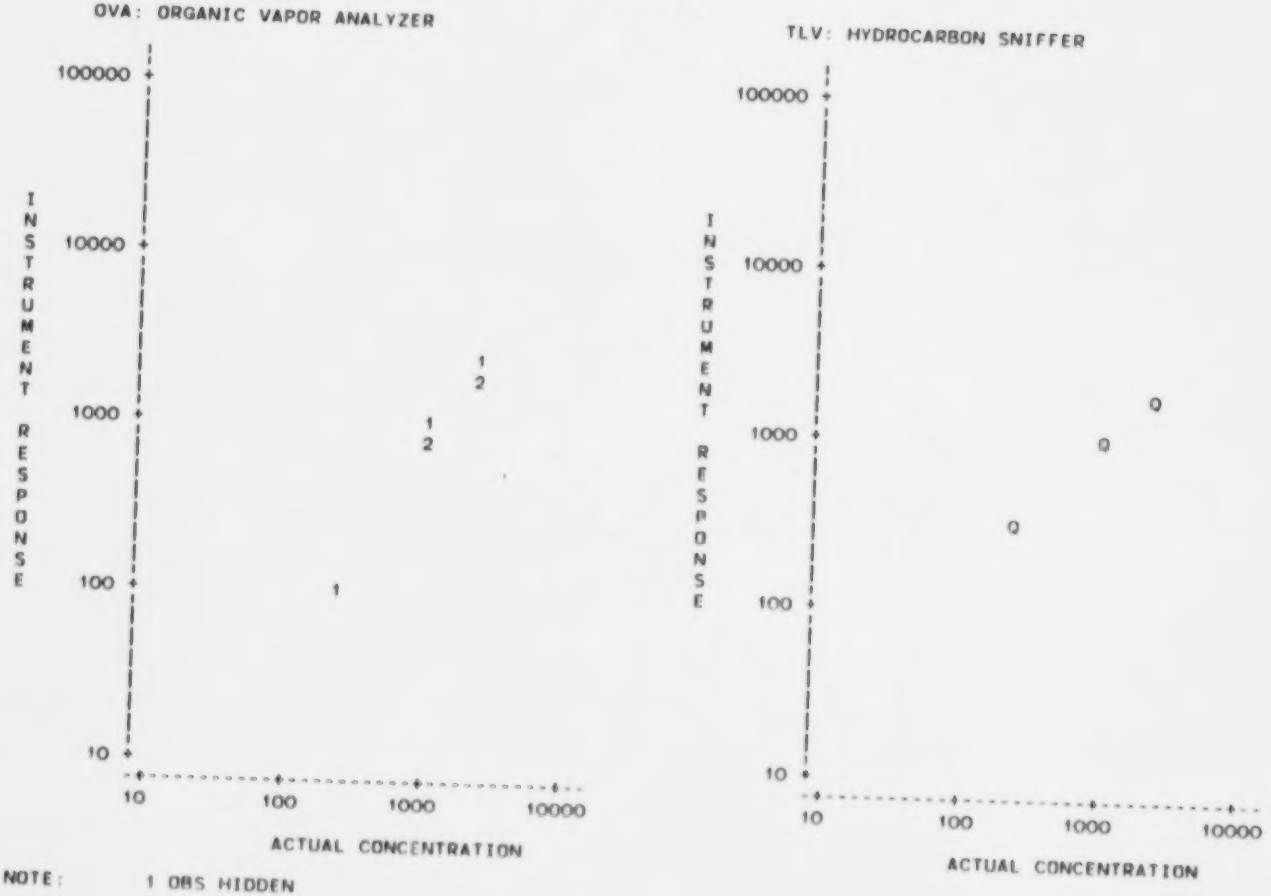
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	223	223	223	0.68		1										0.68		1
1000	1051	1051	1051	1.09		1										1.09		1
2000	2165	2165	2165	1.17		1										1.17		1
		OVERALL MEANS		0.98		3										0.98	0.15	3

ESTIMATED AT 10,000 PPMV 1.78 95 % CONFIDENCE INTERVAL : (1.19, 2.66)

Figure 5-14

INSTRUMENT RESPONSE VS CONCENTRATION

AMYL ALCOHOL,N-



NOTE: 1 OBS HIDDEN

TABLE 5-15

RESPONSE FACTOR SUMMARY

AMYLENE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	236	236	236	1.46	0.24	2	1.22		1	1.69		1						
1500	1429	1429	1429	0.76	0.19	2	0.57		1	0.95		1						
4000	4012	4012	4012	0.45	0.05	2	0.40		1	0.51		1						
6000	5849	5849	5849															
8000	7771	7771	7771															
	OVERALL MEANS			0.89	0.03	6	0.73	0.25	3	1.05	0.35	3						

ESTIMATED AT 10,000 PPMV 0.31 95 % CONFIDENCE INTERVAL : (0.19, 0.51)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	236	236	236	4.87	2.96	2	7.83		1	1.91		1						
1500	1429	1429	1429	2.58	1.44	2	4.02		1	1.13		1						
4000	4012	4012	4012	1.30	0.43	2	1.73		1	0.87		1						
6000	5849	5849	5849	1.39		1				1.39		1						
8000	7771	7771	7771	2.28	1.28	2	3.55		1	1.00		1						
	OVERALL MEANS			2.60	0.17	9	4.28	1.28	4	1.26	0.18	5						

ESTIMATED AT 10,000 PPMV 1.03 95 % CONFIDENCE INTERVAL : (0.46, 2.32)

Figure 5-15

INSTRUMENT RESPONSE VS CONCENTRATION

AMYLENE

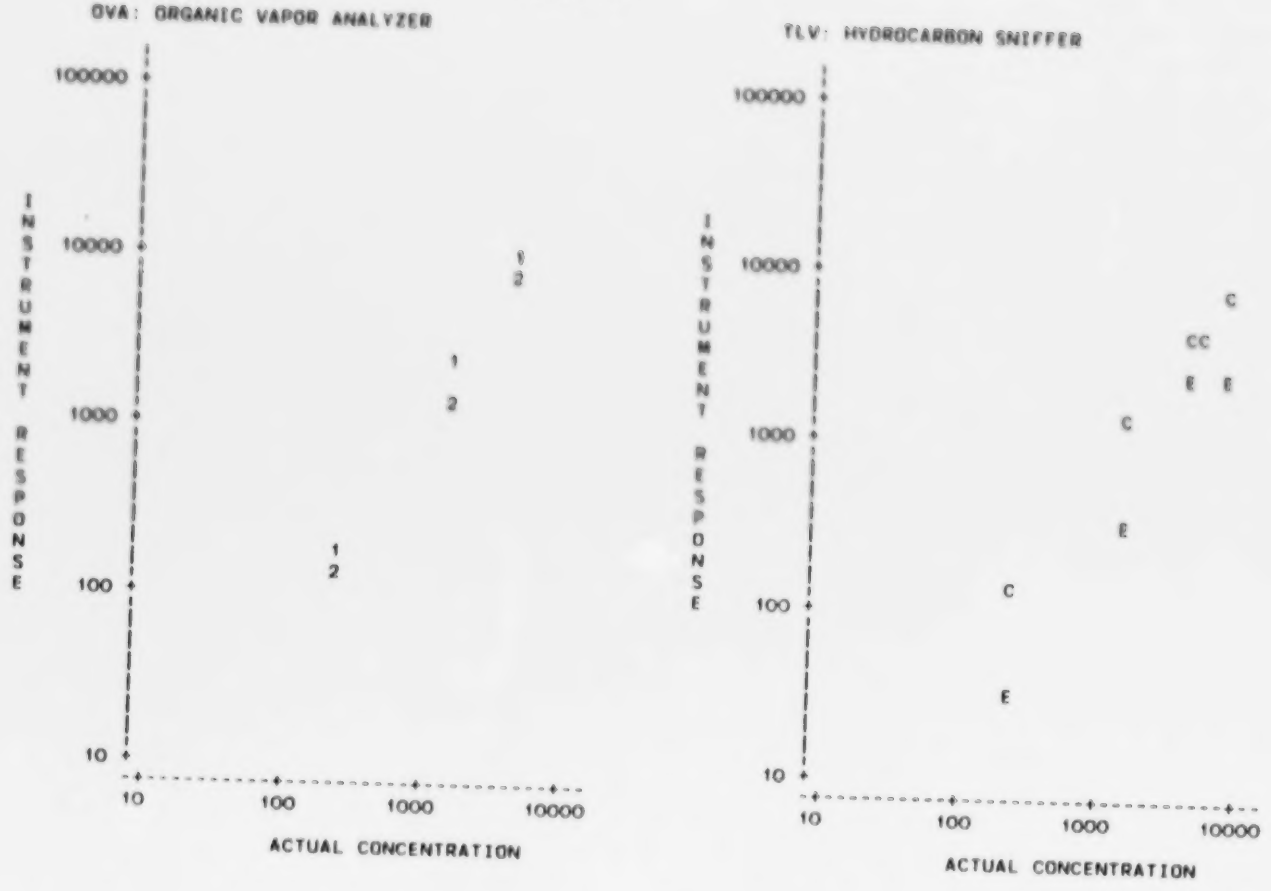


TABLE 5-16

RESPONSE FACTOR SUMMARY

ANISOLE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	198	198	198	0.97	0.05	2	0.92		1	1.03		1						
1500	1530	1530	1530	0.79	0.06	2	0.73		1	0.85		1						
3200	3443	3443	3443	1.05	0.06	2	0.98		1	1.11		1						
		OVERALL MEANS		0.94	0.01	6	0.88	0.08	3	1.00	0.08	3						

ESTIMATED AT 10,000 PPMV 0.92

95 % CONFIDENCE INTERVAL : (0.64, 1.32)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	198	198	198	0.95		1										0.95		1
1500	1530	1530	1530	1.47		1										1.47		1
3200	3443	3443	3443	2.16		1										2.16		1
		OVERALL MEANS		1.52		3										1.52	0.35	3

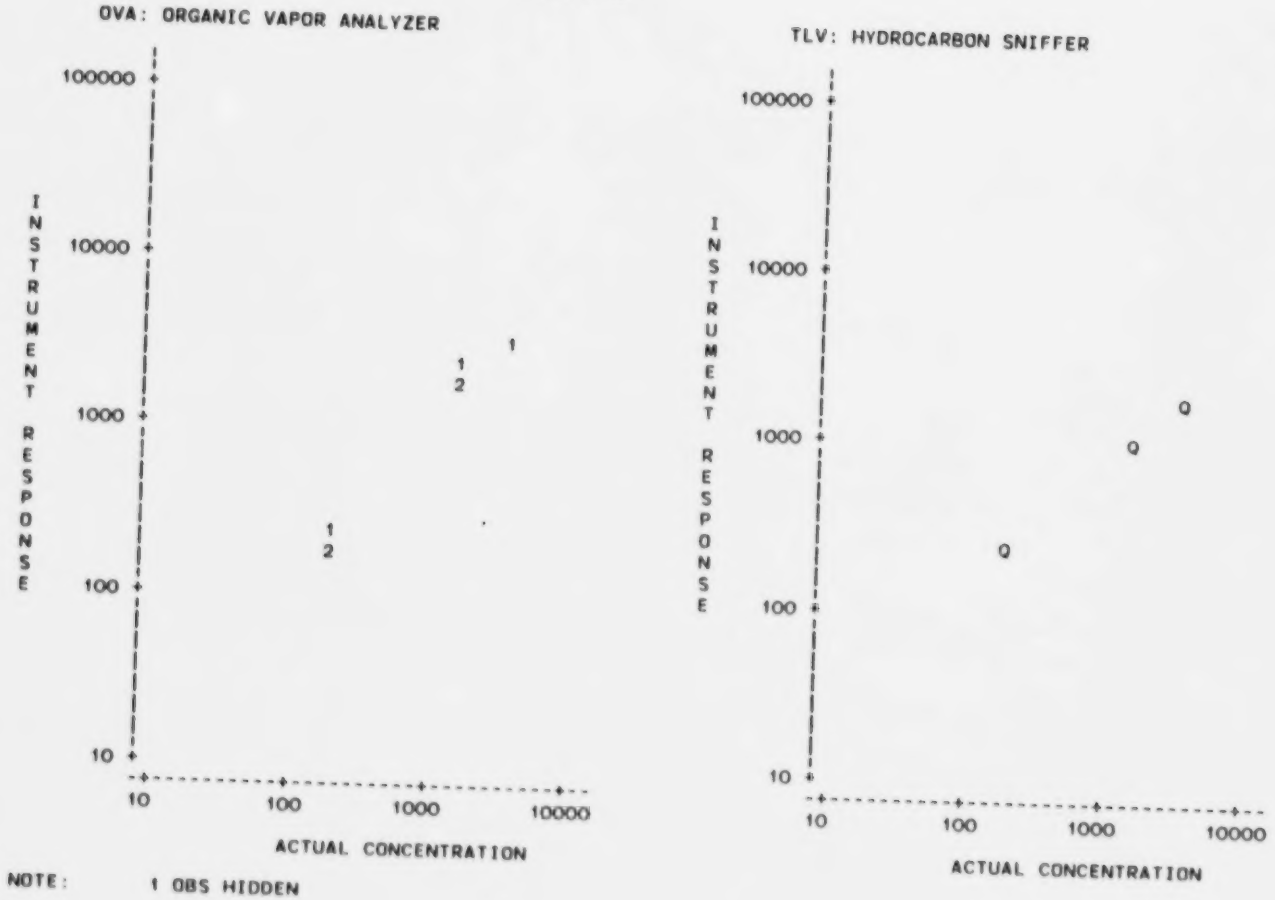
ESTIMATED AT 10,000 PPMV 2.69

95 % CONFIDENCE INTERVAL : (1.69, 4.27)

Figure 5-16

INSTRUMENT RESPONSE VS CONCENTRATION

ANISOLE



NOTE: 1 OBS HIDDEN

TABLE 5-17

RESPONSE FACTOR SUMMARY

BENZALDEHYDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	196	196	196	1.99	0.03	2
800	798	798	798	2.07	0.05	2
1200	1179	1179	1179	2.22	0.35	2
OVERALL MEANS				2.10	0.02	6
ESTIMATED AT 10,000 PPMV				2.36		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1.96		1	2.02		1						
2.13		1	2.02		1						
1.87		1	2.56		1						
1.99	0.07	3	2.20	0.18	3						

95 % CONFIDENCE INTERVAL : (1.52, 3.68)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	196	196	196	0.89		1
800	798	798	798	1.81		1
1200	1179	1179	1179	2.16		1
OVERALL MEANS				1.62		3
ESTIMATED AT 10,000 PPMV				6.30		

RESPONSE FACTORS

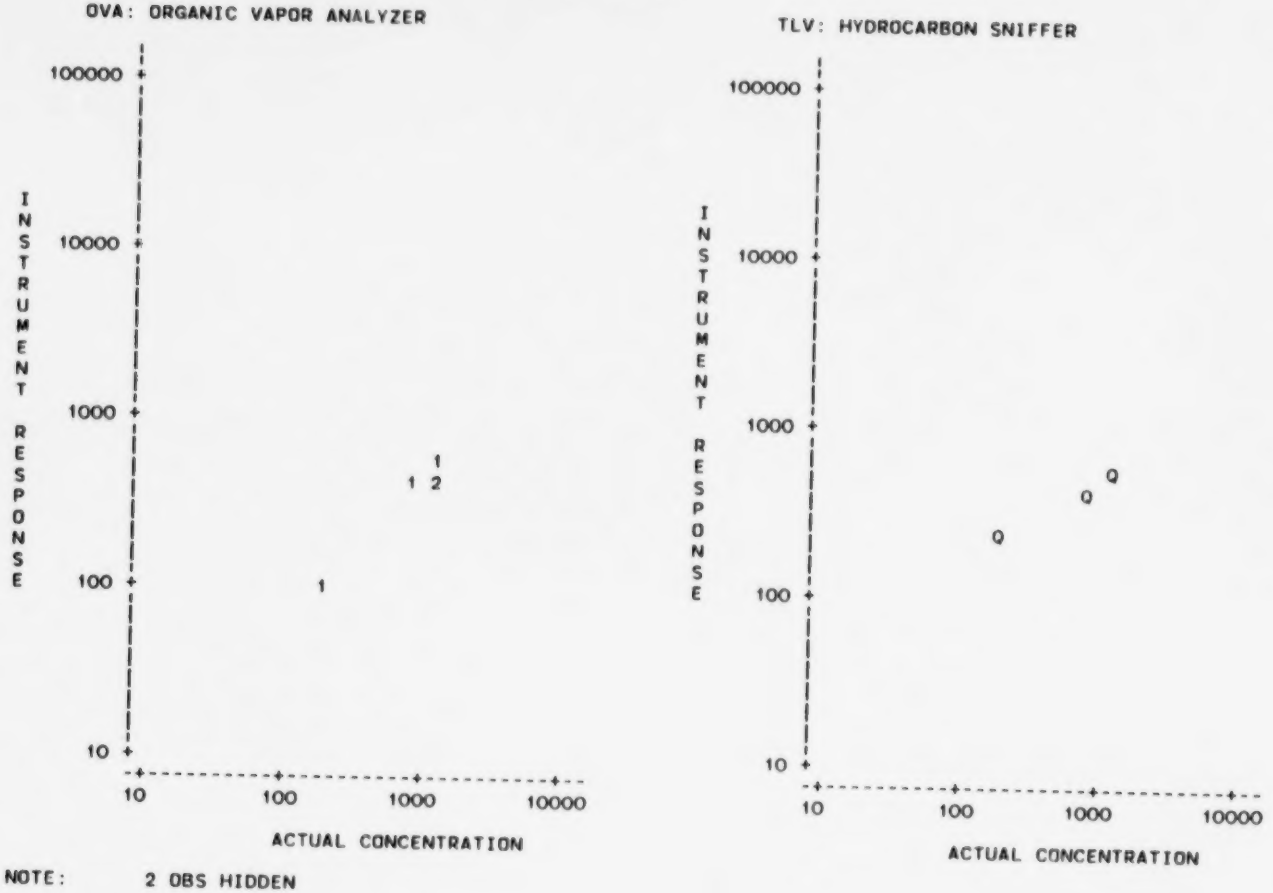
TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
									0.89		1
									1.81		1
									2.16		1
									1.62	0.38	3

95 % CONFIDENCE INTERVAL : (5.77, 6.88)

Figure 5-17

INSTRUMENT RESPONSE VS CONCENTRATION

BENZALDEHYDE



NOTE: 2 OBS HIDDEN

TABLE 5-18

RESPONSE FACTOR SUMMARY

BENZENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
50	47	60	54	0.88	0.06	4	0.95	0.29	2	0.82	0.05	2						
150	200	200	200	0.53		1										0.53		1
200	197	197	197															
250	263	263	263	0.52		1										0.52		1
350	369	369	369	0.48		1										0.48		1
500	516	545	535	0.51	0.05	6	0.53	0.01	2	0.58	0.03	2	0.36		1	0.45		1
750	790	790	790	0.40	0.02	2							0.38		1	0.42		1
1000	939	939	939	0.36	0.03	2							0.33		1	0.38		1
1250	1372	1372	1372	0.38	0.01	2							0.38		1	0.39		1
1500	1572	1576	1574	0.36	0.01	2							0.37		1	0.35		1
2000	2122	2122	2122	0.32	0.01	2							0.33		1	0.31		1
2400	2434	2434	2434	0.27	0.00	2							0.27		1	0.27		1
2800	2756	2756	2756	0.28	0.00	2							0.28		1	0.28		1
3000	3176	3176	3176															
3200	3110	3110	3110															
3600	3922	3922	3922															
4000	3262	3504	3383	0.32	0.01	4	0.30	0.02	2	0.33	0.05	2						
OVERALL MEANS				0.45	0.00	31	0.59	0.14	6	0.58	0.09	6	0.34	0.01	8	0.40	0.03	11

ESTIMATED AT 10,000 PPMV 0.21

95 % CONFIDENCE INTERVAL : (0.19, 0.24)

TABLE 5-18 (continued)

RESPONSE FACTOR SUMMARY

BENZENE

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
50	47	60	54	0.87	0.08	4	0.95	0.02	2	0.79	0.05	2						
150	200	200	200	0.80		1				0.80		1						
200	197	197	197	0.87		1				0.87		1						
250	263	263	263	0.86		1				0.86		1						
350	369	369	369	0.95		1				0.95		1						
500	516	545	535	1.07	0.14	5	1.23	0.01	2	0.96	0.02	3						
750	790	790	790	1.06		1				1.06		1						
1000	939	939	939	1.09		1				1.09		1						
1250	1372	1372	1372	0.96		1				0.96		1						
1500	1572	1576	1574	0.98		2				0.98	0.00	2						
2000	2122	2122	2122	1.07		1				1.07		1						
2400	2434	2434	2434	1.00		1				1.00		1						
2800	2756	2756	2756	1.07		1				1.07		1						
3000	3176	3176	3176	1.14		1				1.14		1						
3200	3110	3110	3110	1.08		1				1.08		1						
3600	3922	3922	3922	1.24		1				1.24		1						
4000	3262	3504	3383	0.89	0.09	4	0.98	0.06	2	0.81	0.07	2						
			OVERALL MEANS	0.98	0.00	28	1.05	0.06	6	0.96	0.03	22						

ESTIMATED AT 10,000 PPMV 1.07

95 % CONFIDENCE INTERVAL : (0.97, 1.19)

Figure 5-18

INSTRUMENT RESPONSE VS CONCENTRATION

BENZENE

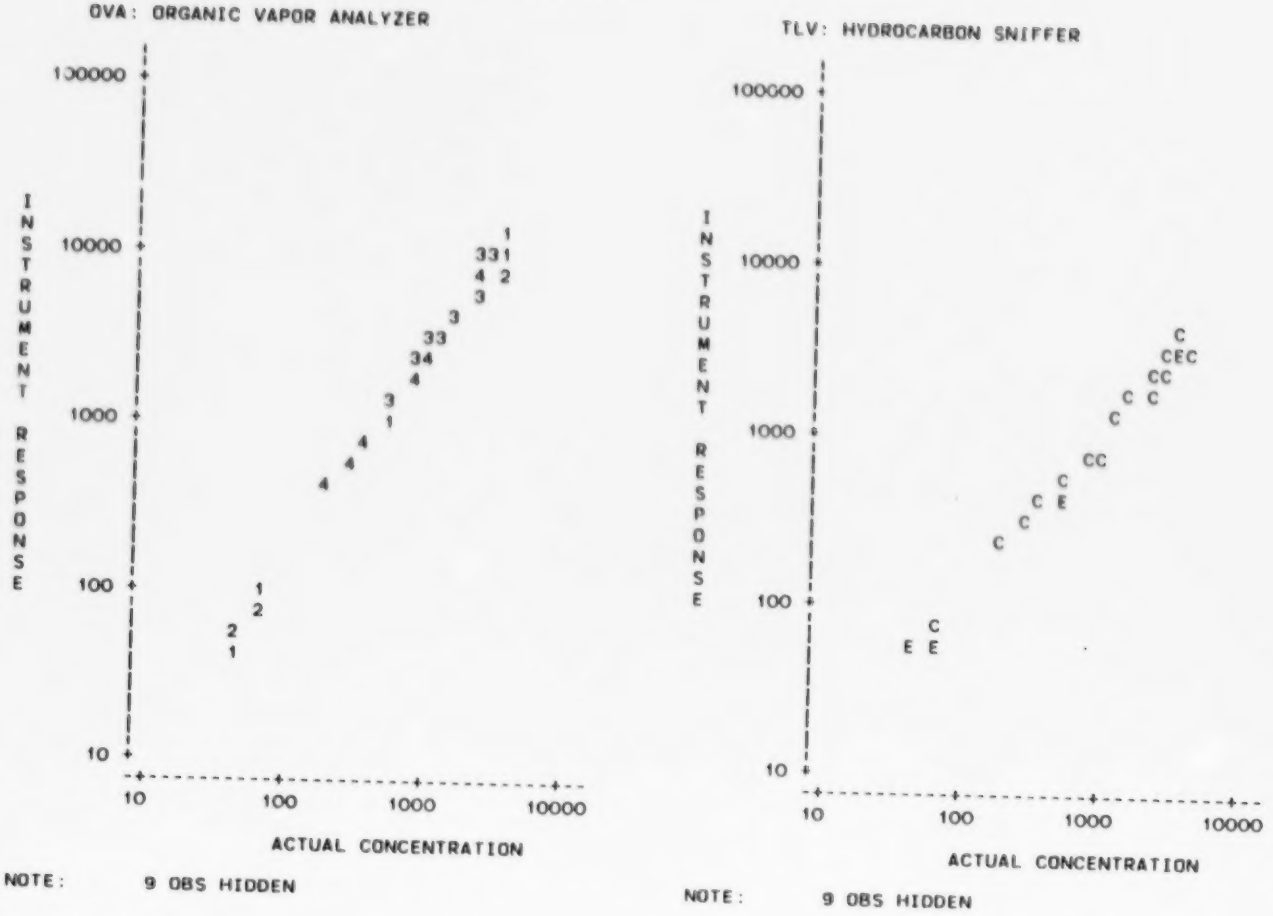


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TABLE 5-19

RESPONSE FACTOR SUMMARY

BENZONITRILE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	164	170	167	0.83	0.02	4
650	532	550	541	0.89	0.01	4
1100	871	992	931	1.43	0.02	4
			OVERALL MEANS	1.05	0.00	12
			ESTIMATED AT 10,000 PPMV	2.24		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
0.81	0.02	2	0.85	0.01	2						
0.88	0.00	2	0.90	0.02	2						
1.41	0.37	2	1.45	0.46	2						
1.03	0.15	6	1.07	0.17	6						

95 % CONFIDENCE INTERVAL : (1.18, 4.24)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	164	170	167	0.84		2
650	532	550	541	1.48		2
1100	871	992	931	2.55		2
			OVERALL MEANS	1.62		6
			ESTIMATED AT 10,000 PPMV	9.13		

RESPONSE FACTORS

TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
									0.84	0.01	2
									1.48	0.27	2
									2.55	0.82	2
									1.62	0.39	6

95 % CONFIDENCE INTERVAL : (2.82,29.62)

Figure 5-19

INSTRUMENT RESPONSE VS CONCENTRATION

BENZONITRILE

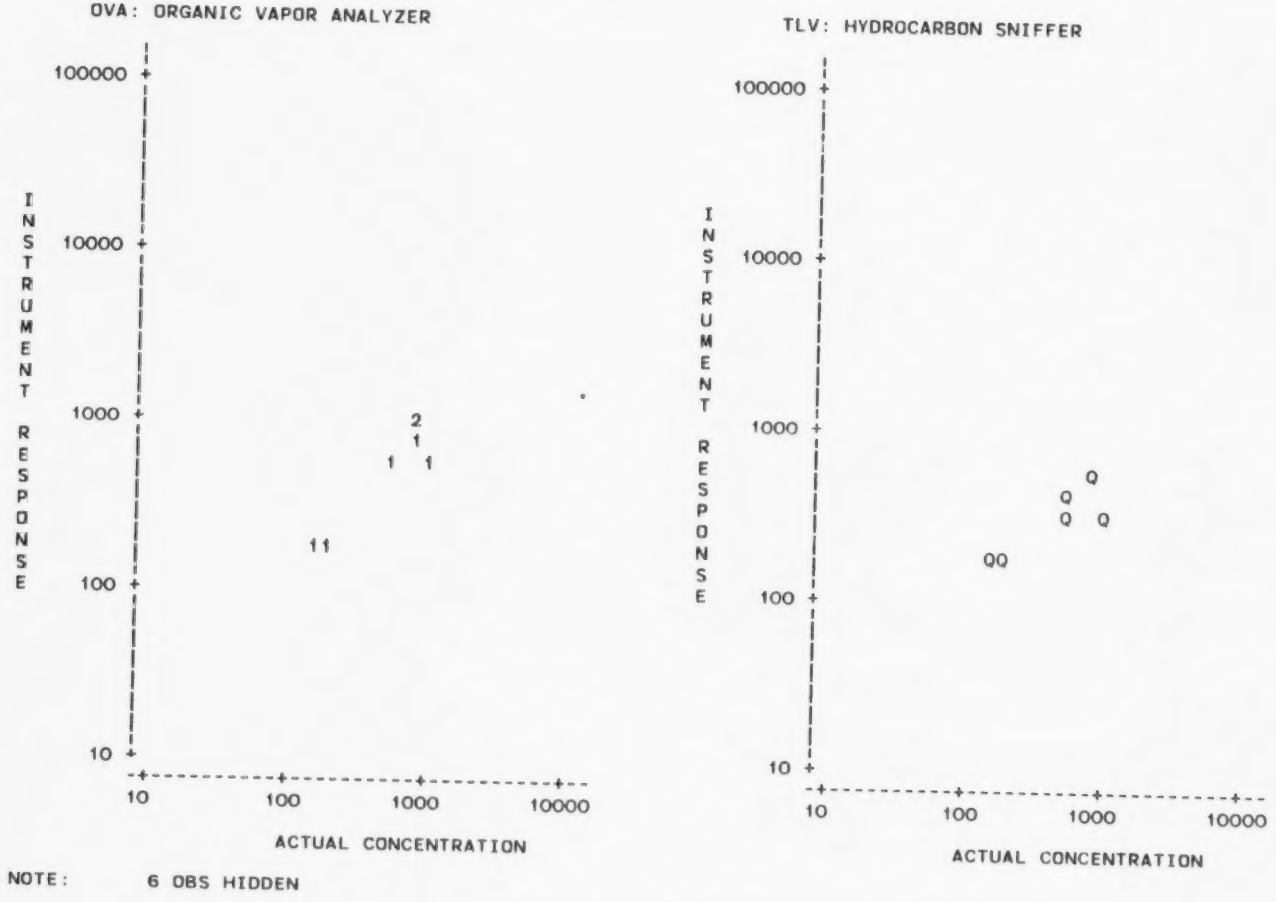


TABLE 5-20

RESPONSE FACTOR SUMMARY

BENZOYL CHLORIDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	203	203	203	1.81	0.06	2	1.75		1	1.87		1						
1500	1482	1482	1482	2.04	0.13	2	1.91		1	2.16		1						
8000	7694	7694	7694	8.11	0.38	2	8.49		1	7.73		1						
		OVERALL MEANS		3.98	0.01	6	4.05	2.22	3	3.92	1.91	3						

ESTIMATED AT 10,000 PPMV 6.40 95 % CONFIDENCE INTERVAL : (3.20,12.80)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	203	203	203	0.97		1										0.97		1
1500	1482	1482	1482	2.11		1										2.11		1
8000	7694	7694	7694	6.49		1										6.49		1
		OVERALL MEANS		3.19		3										3.19	1.68	3

ESTIMATED AT 10,000 PPMV 6.60 95 % CONFIDENCE INTERVAL : (3.41,12.79)

Figure 5-20

INSTRUMENT RESPONSE VS CONCENTRATION

BENZOYL CHLORIDE

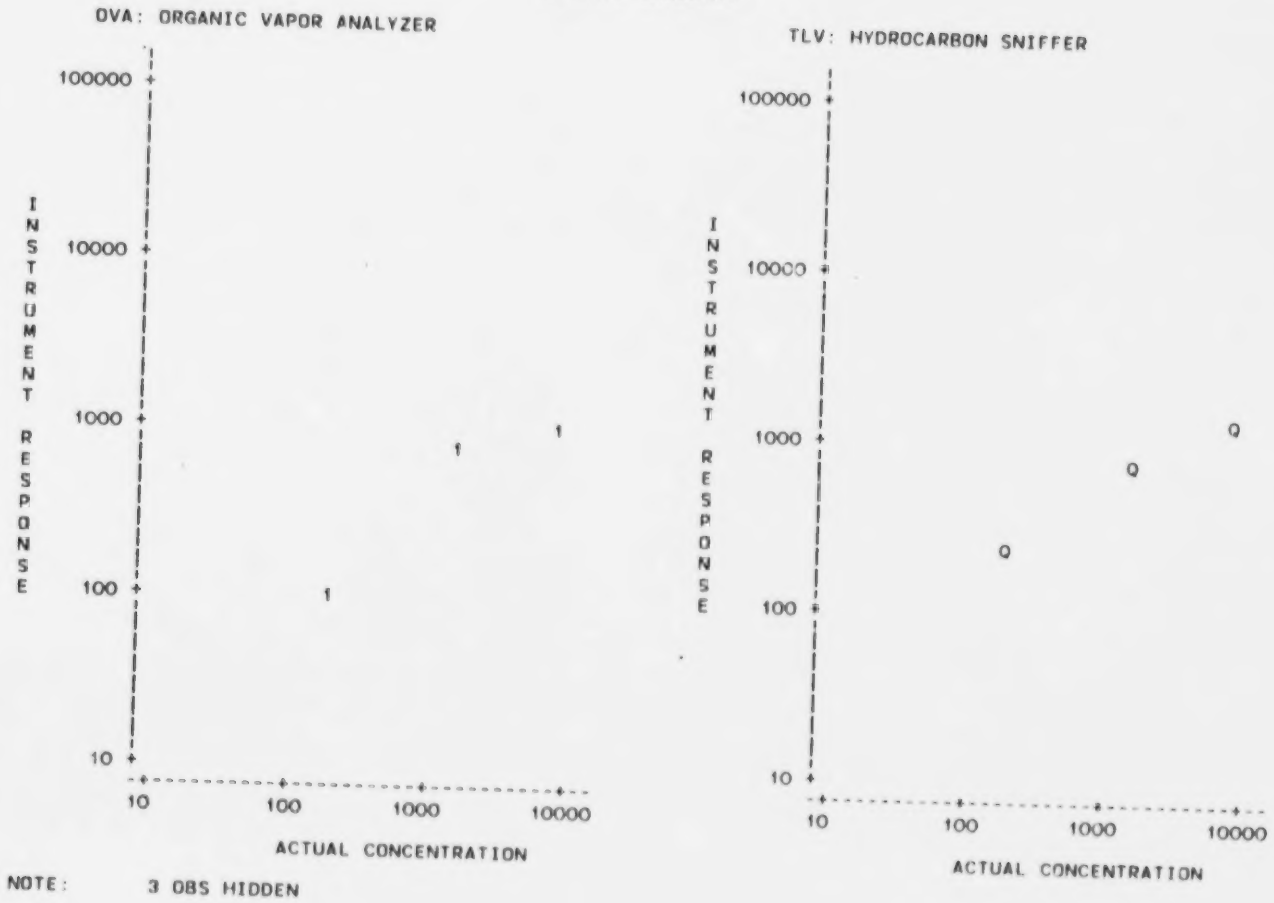


TABLE 5-21

RESPONSE FACTOR SUMMARY

BENZYL CHLORIDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	199	199	199	1.03	0.01	2
1500	1533	1533	1533	1.05	0.14	2
6000	5966	6527	6246	4.65	0.36	4
8000	7810	7940	7875	5.15	0.53	4
			OVERALL MEANS	3.61	0.03	12
			ESTIMATED AT 10,000 PPMV	4.23		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1.02		1	1.04		1						
0.91		1	1.19		1						
4.29	2.29	2	5.02	2.29	2						
4.62	0.70	2	5.67	1.94	2						
3.29	0.96	6	3.93	1.19	6						

95 % CONFIDENCE INTERVAL : (2.74, 6.52)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	199	199	199	0.79		1
1500	1533	1533	1533	1.07		1
6000	5966	6527	6246	5.14		2
8000	7810	7940	7875	5.39		2
			OVERALL MEANS	3.82		6
			ESTIMATED AT 10,000 PPMV	4.87		

RESPONSE FACTORS

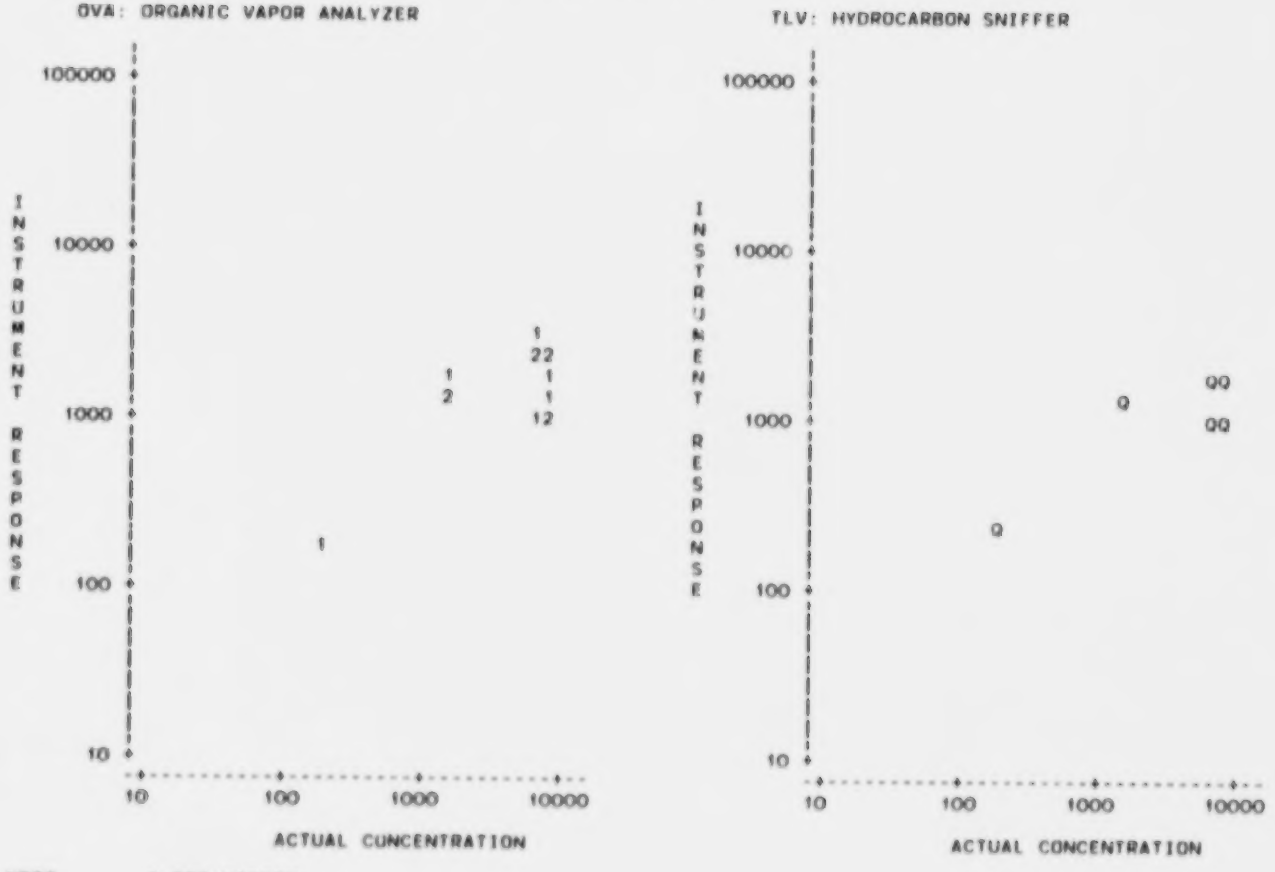
TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
									0.79		1
									1.07		1
									5.14	2.18	2
									5.39	1.61	2
									3.82	1.15	6

95 % CONFIDENCE INTERVAL : (2.50, 9.48)

Figure 5-21

INSTRUMENT RESPONSE VS CONCENTRATION

BENZYL CHLORIDE



NOTE: 2 OBS HIDDEN

TABLE 5-22

RESPONSE FACTOR SUMMARY

BROMOBENZENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS: 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1810	1810 SE	1810 N
200	208	208	208	0.55	0.00	2	0.55		1	0.55		1						
1500	1549	1549	1549	0.51	0.00	2	0.51		1	0.50		1						
3000	3011	3011	3011	0.38	0.00	2	0.38		1	0.37		1						
		OVERALL MEANS		0.48	0.00	6	0.48	0.05	3	0.47	0.05	3						

ESTIMATED AT 10,000 PPMV 0.36

95 % CONFIDENCE INTERVAL : (0.28, 0.46)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS: 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	208	208	208	0.62		1										0.62		1
1500	1549	1549	1549	0.77		1										0.77		1
3000	3011	3011	3011	1.02		1										1.02		1
		OVERALL MEANS		0.81		3										0.81	0.12	3

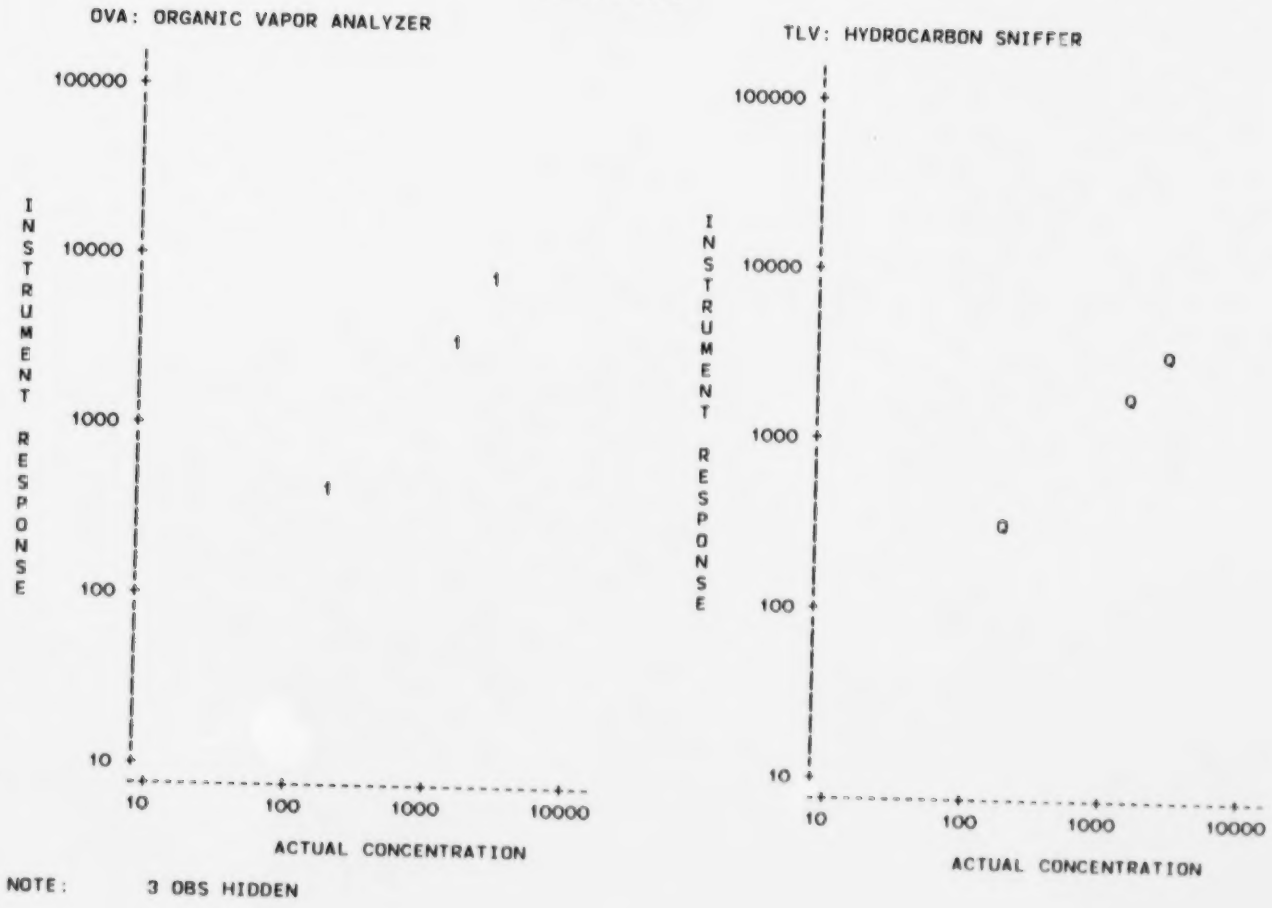
ESTIMATED AT 10,000 PPMV 1.16

95 % CONFIDENCE INTERVAL : (0.69, 1.94)

Figure 5-22

INSTRUMENT RESPONSE VS CONCENTRATION

BROMOBENZENE



NOTE: 3 OBS HIDDEN

TABLE 5-23

RESPONSE FACTOR SUMMARY

BUTADIENE, 1,3-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1000	875	875	875	2.18	0.08	2	2.26		1	2.10		1						
3000	2965	2965	2965	0.94	0.02	2	0.93		1	0.96		1						
5000	4902	4902	4902	0.61	0.02	2	0.60		1	0.62		1						
15E3	15E3	15E3	15E3															
	OVERALL MEANS			1.25	0.00	6	1.26	0.51	3	1.23	0.45	3						

ESTIMATED AT 10,000 PPMV 0.37

95 % CONFIDENCE INTERVAL : (0.34, 0.42)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
1000	875	875	875	3.20		1										3.20		1
3000	2965	2965	2965	4.55		1										4.55		1
5000	4902	4902	4902	5.13		1										5.13		1
15E3	15E3	15E3	15E3	6.49		1										6.49		1
	OVERALL MEANS			4.85		4										4.85	0.63	4

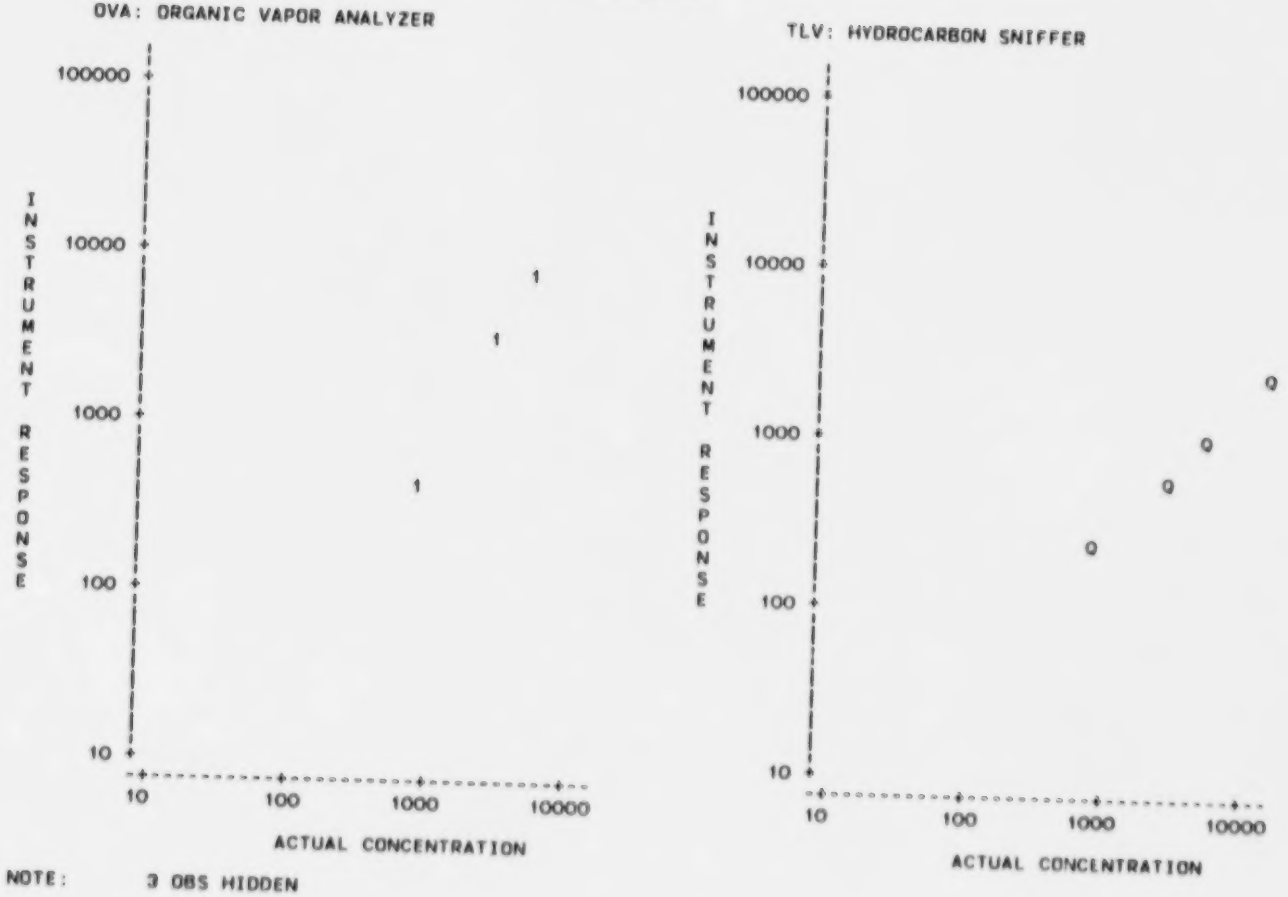
ESTIMATED AT 10,000 PPMV 6.00

95 % CONFIDENCE INTERVAL : (5.64, 6.39)

Figure 5-23

INSTRUMENT RESPONSE VS CONCENTRATION

BUTADIENE, 1,3-



NOTE: 3 OBS HIDDEN

TABLE 5-24

RESPONSE FACTOR SUMMARY

BUTANE,N-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1000	964	964	964	1.02	0.05	2	0.97		1	1.06		1						
4000	4043	4181	4112	0.61	0.01	4	0.60	0.03	2	0.63	0.03	2						
5000	3955	5006	4480	0.48	0.00	4	0.48	0.03	2	0.48	0.02	2						
6000	6016	6016	6016															
11E3	11E3	11E3	11E3															
OVERALL MEANS				0.64	0.00	10	0.62	0.09	5	0.66	0.11	5						

ESTIMATED AT 10.000 PPMV 0.38

95 % CONFIDENCE INTERVAL : (0.31, 0.46)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
1000	964	964	964	0.47		1										0.47		1
4000	4043	4181	4112	0.64		2										0.64	0.01	2
5000	3955	5006	4480	0.58		2										0.58	0.04	2
6000	6016	6016	6016	0.62		1										0.62		1
11E3	11E3	11E3	11E3	0.67		1										0.67		1
OVERALL MEANS				0.60		7										0.60	0.03	7

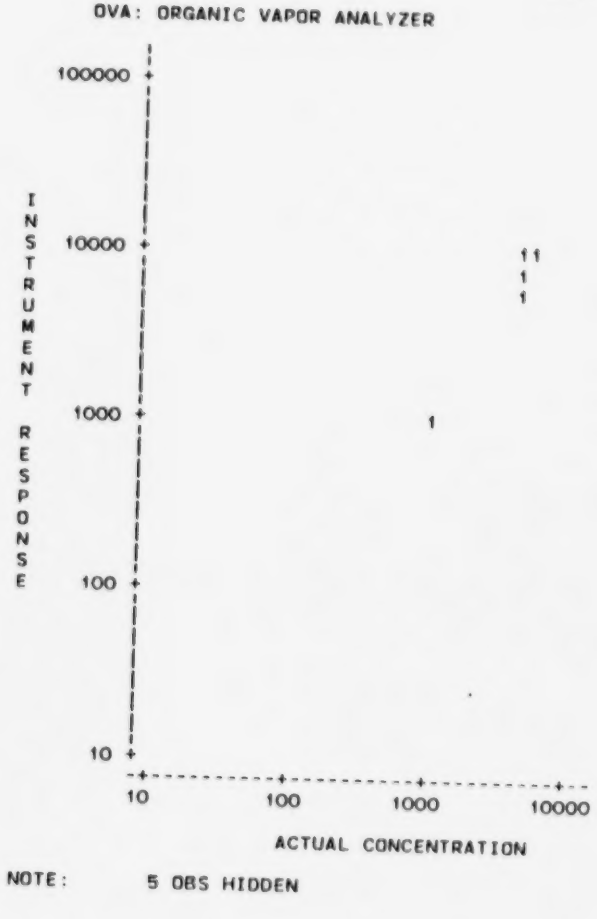
ESTIMATED AT 10.000 PPMV 0.68

95 % CONFIDENCE INTERVAL : (0.61, 0.75)

Figure 5-24

INSTRUMENT RESPONSE VS CONCENTRATION

BUTANE,N-



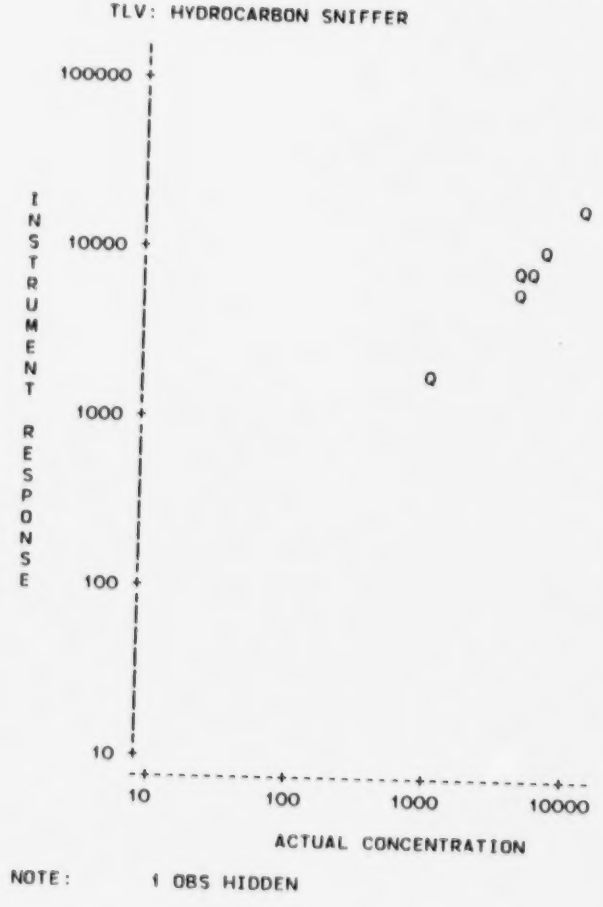


TABLE 5-25

RESPONSE FACTOR SUMMARY

BUTANOL,N

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	178	178	178	1.77		1
1500	1522	1522	1522	2.00		1
6000	5564	5564	5564	1.36		1
			OVERALL MEANS	1.71		3
			ESTIMATED AT 10,000 PPMV	1.43		

RESPONSE FACTORS

OVA METERS

1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
						1.77		1			
						2.00		1			
						1.36		1			
						1.71	0.19	3			

95 % CONFIDENCE INTERVAL : (0.66, 3.13)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	178	178	178	0.94		1
1500	1522	1522	1522	2.03		1
6000	5564	5564	5564	2.23		1
			OVERALL MEANS	1.73		3
			ESTIMATED AT 10,000 PPMV	2.80		

RESPONSE FACTORS

TLV METERS

7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
			0.94		1						
			2.03		1						
			2.23		1						
			1.73	0.40	3						

95 % CONFIDENCE INTERVAL : (1.49, 5.27)

Figure 5-25

INSTRUMENT RESPONSE VS CONCENTRATION

BUTANOL,N

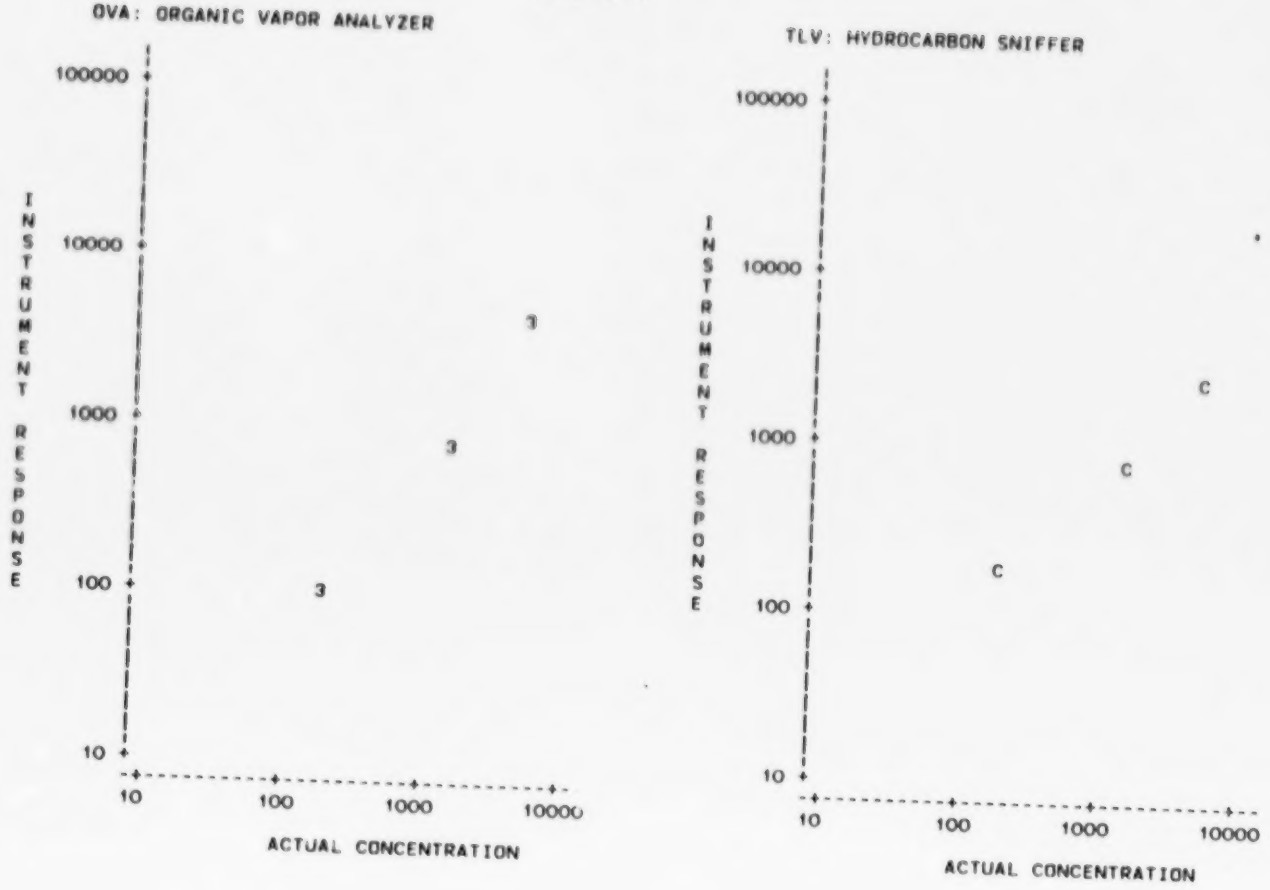


TABLE 5-26

RESPONSE FACTOR SUMMARY

BUTANOL,SEC-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	230	230	230	2.22	0.05	2	2.17		1	2.27		1						
1500	1432	1432	1432	1.34	0.03	2	1.31		1	1.37		1						
6000	5968	5968	5968	0.81	0.04	2	0.77		1	0.85		1						
8000	7994	7994	7994															
OVERALL MEANS				1.46	0.01	6	1.41	0.41	3	1.50	0.42	3						

ESTIMATED AT 10,000 PPMV 0.70

95 % CONFIDENCE INTERVAL : (0.63, 0.78)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	230	230	230	1.31	0.22	2	1.53		1	1.09		1						
1500	1432	1432	1432	1.36	0.20	2	1.55		1	1.16		1						
6000	5968	5968	5968	1.42	0.20	2	1.62		1	1.22		1						
8000	7994	7994	7994	1.16	0.11	2	1.27		1	1.06		1						
OVERALL MEANS				1.31	0.02	8	1.49	0.08	4	1.13	0.04	4						

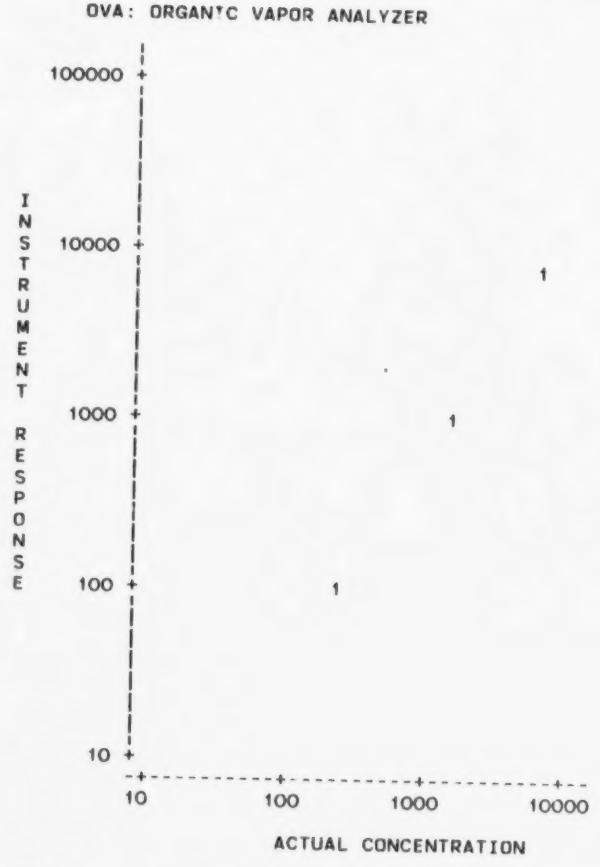
ESTIMATED AT 10,000 PPMV 1.26

95 % CONFIDENCE INTERVAL : (1.00, 1.57)

Figure 5-26

INSTRUMENT RESPONSE VS CONCENTRATION

BUTANOL, SEC-



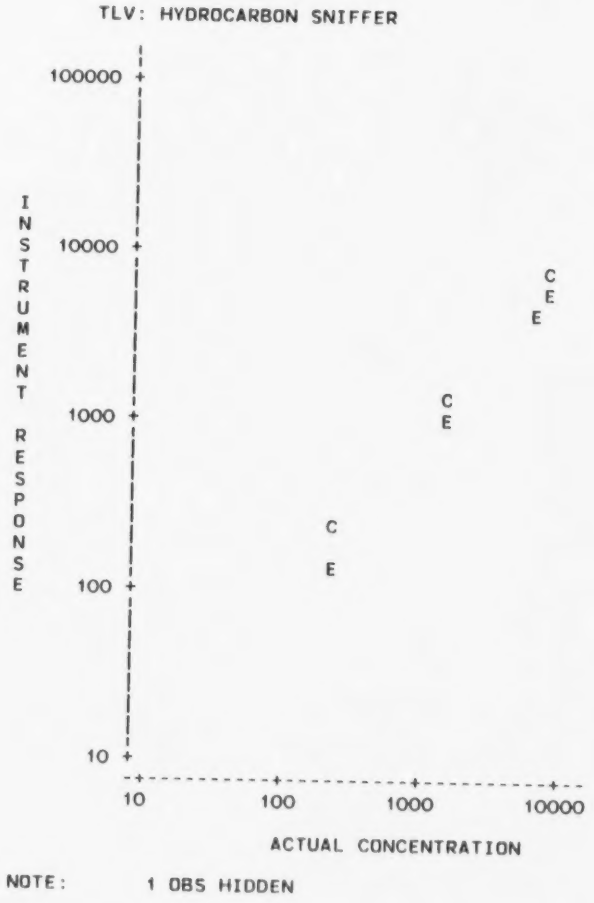


TABLE 5-27

RESPONSE FACTOR SUMMARY

BUTANOL,TERT

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	229	229	229	1.20	0.11	2
1500	1571	1571	1571	0.98	0.10	2
4000	4067	4067	4067	0.50	0.05	2
6000	6246	6246	6246			
8000	7715	7715	7715			
		OVERALL MEANS		0.89	0.01	6
	ESTIMATED AT 10,000 PPMV			0.44		

RESPONSE FACTORS

OVA METERS											
1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
						1.09		1	1.30		1
						0.88		1	1.09		1
						0.54		1	0.45		1
						0.84	0.16	3	0.95	0.26	3

95 % CONFIDENCE INTERVAL : (0.26, 0.74)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	229	229	229	2.18		1
1500	1571	1571	1571	2.88		1
4000	4067	4067	4067	1.77		1
6000	6246	6246	6246	2.40		1
8000	7715	7715	7715	2.27		1
		OVERALL MEANS		2.30		5
	ESTIMATED AT 10,000 PPMV			2.19		

RESPONSE FACTORS

TLV METERS											
7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
			2.18		1						
			2.88		1						
			1.77		1						
			2.40		1						
			2.27		1						
			2.30	0.18	5						

95 % CONFIDENCE INTERVAL : (1.54, 3.11)

Figure 5-27

INSTRUMENT RESPONSE VS CONCENTRATION

BUTANOL,TERT

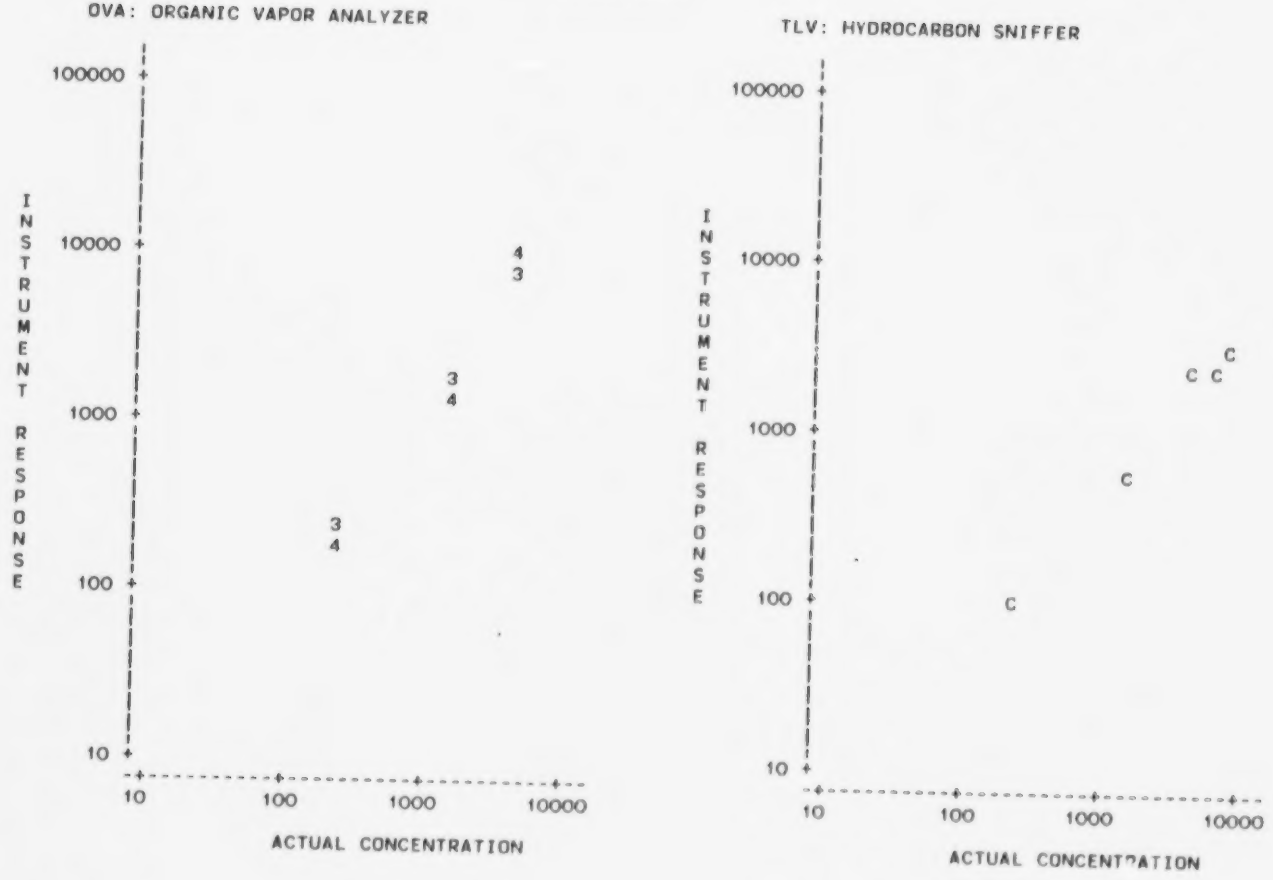


TABLE 5-28

RESPONSE FACTOR SUMMARY

BUTENE, 1-

OVA INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
1000	658	658	658	0.78	0.02	2	0.80		1	0.76		1						
4000	4001	4001	4001	0.61	0.05	2	0.56		1	0.66		1						
5000	5064	5064	5064	0.55	0.02	2	0.53		1	0.58		1						
6000	5861	5861	5861															
12E3	12E3	12E3	12E3															
		OVERALL MEANS		0.65	0.00	6	0.63	0.08	3	0.66	0.05	3						

ESTIMATED AT 10,000 PPMV 0.51 95 % CONFIDENCE INTERVAL : (0.45, 0.58)

TLV INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
1000	658	658	658	1.08		1										1.08		1
4000	4001	4001	4001	1.94		1										1.94		1
5000	5064	5064	5064	2.30		1										2.30		1
6000	5861	5861	5861	2.43		1										2.43		1
12E3	12E3	12E3	12E3	3.33		1										3.33		1
		OVERALL MEANS		2.22		5										2.22	0.36	5

ESTIMATED AT 10,000 PPMV 2.97 95 % CONFIDENCE INTERVAL : (2.73, 3.24)

Figure 5-28

INSTRUMENT RESPONSE VS CONCENTRATION

BUTENE, 1-

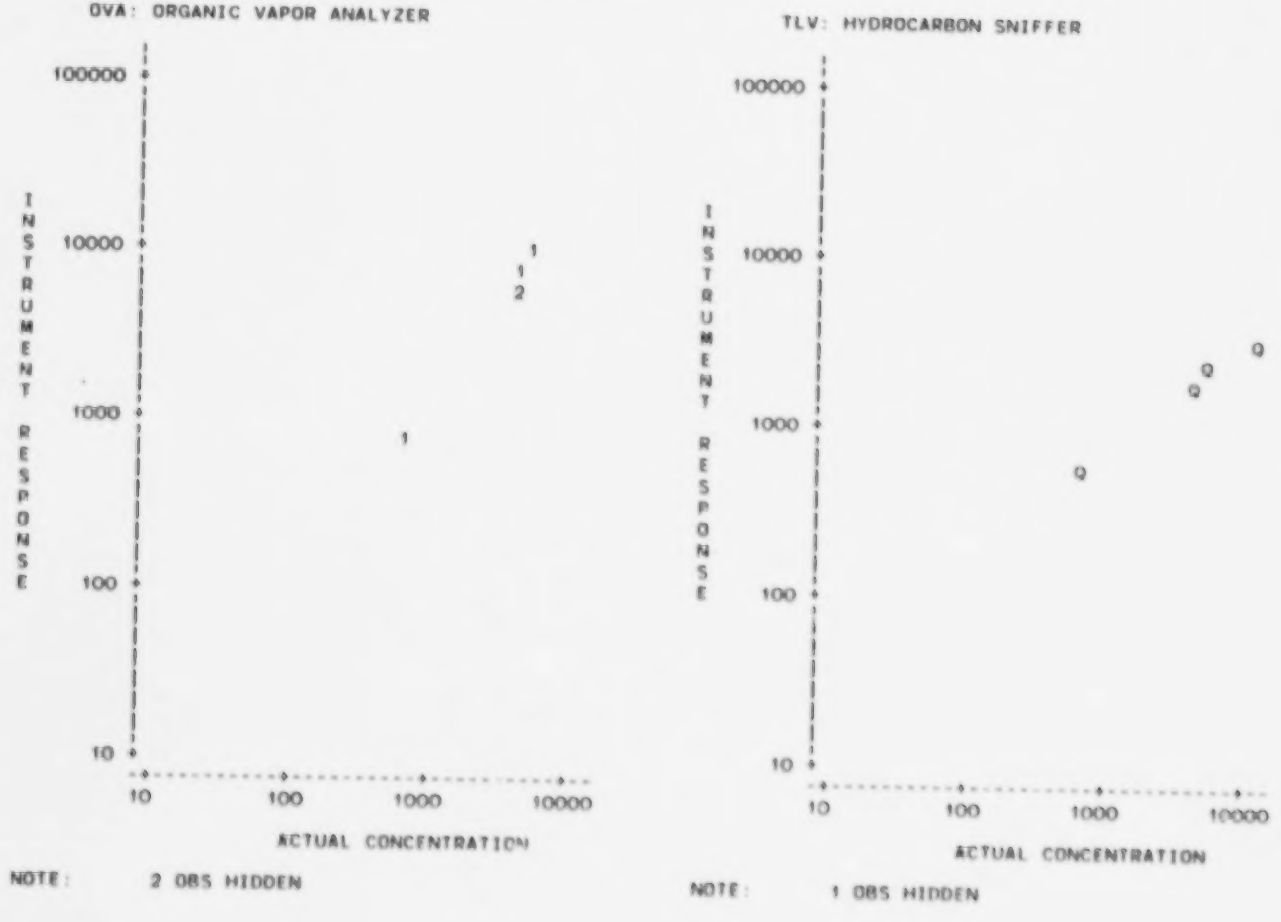


TABLE 5-29

RESPONSE FACTOR SUMMARY

BUTYL ACETATE,

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	217	217	217	1.35	0.01	2
1500	1593	1593	1593	1.08	0.08	2
6000	6114	6114	6114	0.61	0.00	2
8000	8355	8355	8355			
OVERALL MEANS				1.02	0.00	6
ESTIMATED AT 10,000 PPMV				0.60		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1.35		1	1.36		1						
1.16		1	1.00		1						
0.62		1	0.61		1						
1.04	0.22	3	0.99	0.22	3						

95 % CONFIDENCE INTERVAL : (0.46, 0.78)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	217	217	217	0.65		1
1500	1593	1593	1593	0.87		1
6000	6114	6114	6114	1.21		1
8000	8355	8355	8355	1.26		1
OVERALL MEANS				1.00		4
ESTIMATED AT 10,000 PPMV				1.30		

RESPONSE FACTORS

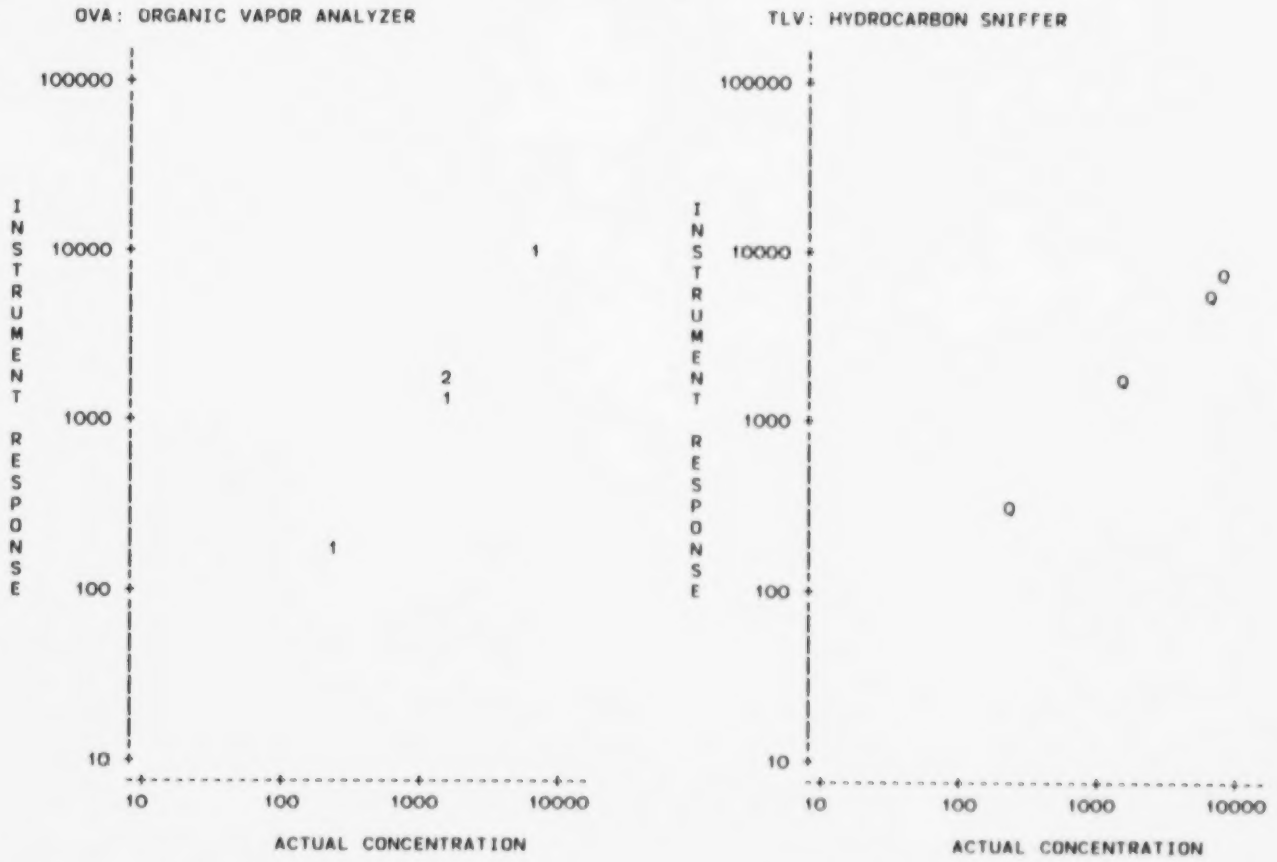
TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7O	SE	N
									0.65		1
									0.87		1
									1.21		1
									1.26		1
									1.00	0.15	4

95 % CONFIDENCE INTERVAL : (1.18, 1.42)

Figure 5-29

INSTRUMENT RESPONSE VS CONCENTRATION

BUTYL ACETATE,



NOTE: 2 OBS HIDDEN

TABLE 5-30

RESPONSE FACTOR SUMMARY

BUTYL ACRYLATE,N-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	206	206	206	1.54	0.08	2	1.46		1	1.62		1						
1500	1527	1527	1527	1.06	0.04	2	1.02		1	1.09		1						
4700	4586	4586	4586	0.74	0.00	2	0.74		1	0.74		1						
			OVERALL MEANS	1.11	0.01	6	1.07	0.21	3	1.15	0.25	3						

ESTIMATED AT 10,000 PPMV 0.64

95 % CONFIDENCE INTERVAL : (0.56, 0.74)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	206	206	206	0.78		1										0.78		1
1500	1527	1527	1527	1.04		1										1.04		1
4700	4586	4586	4586	1.86		1										1.86		1
			OVERALL MEANS	1.23		3										1.23	0.32	3

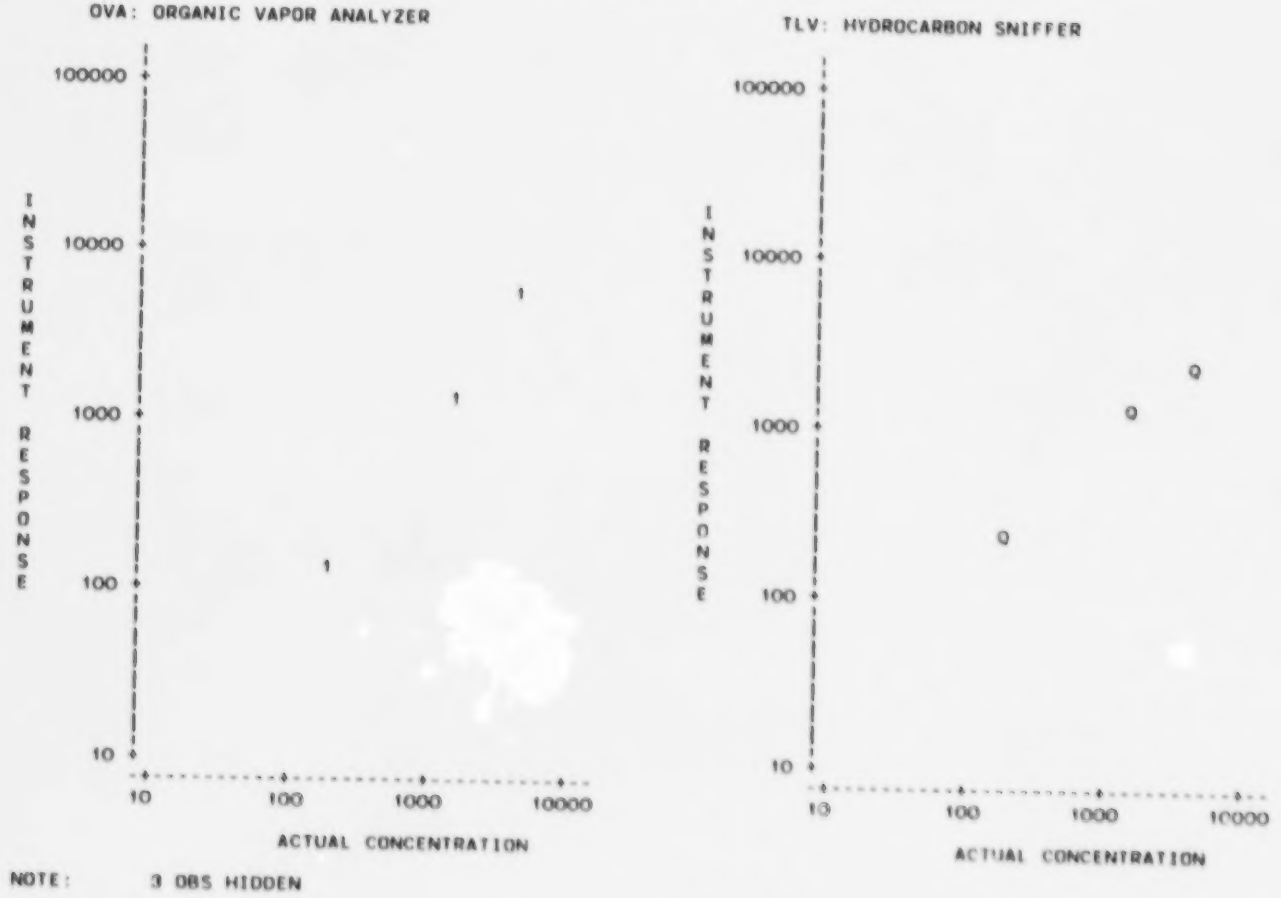
ESTIMATED AT 10,000 PPMV 1.98

95 % CONFIDENCE INTERVAL : (0.89, 4.43)

Figure 5-30

INSTRUMENT RESPONSE VS CONCENTRATION

BUTYL ACRYLATE,N-



NOTE: 3 OBS HIDDEN

TABLE 5-31

RESPONSE FACTOR SUMMARY

BUTYL ETHER,N

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	301	301	301	2.97		1
1500	1946	1946	1946	3.17		1
8000	10E3	10E3	10E3	2.58		1
		OVERALL MEANS		2.91		3
		ESTIMATED AT 10,000 PPMV		2.70		

RESPONSE FACTORS

OVA METERS											
1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
						2.97		1			
						3.17		1			
						2.58		1			
						2.91	0.17	3			

95 % CONFIDENCE INTERVAL : (1.95, 3.73)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	301	301	301	1.18		1
1500	1946	1946	1946	2.29		1
8000	10E3	10E3	10E3	2.48		1
		OVERALL MEANS		1.98		3
		ESTIMATED AT 10,000 PPMV		2.66		

RESPONSE FACTORS

TLV METERS											
7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
			1.18		1						
			2.29		1						
			2.48		1						
			1.98	0.41	3						

95 % CONFIDENCE INTERVAL : (1.42, 4.95)

Figure 5-31

INSTRUMENT RESPONSE VS CONCENTRATION

BUTYL ETHER,N

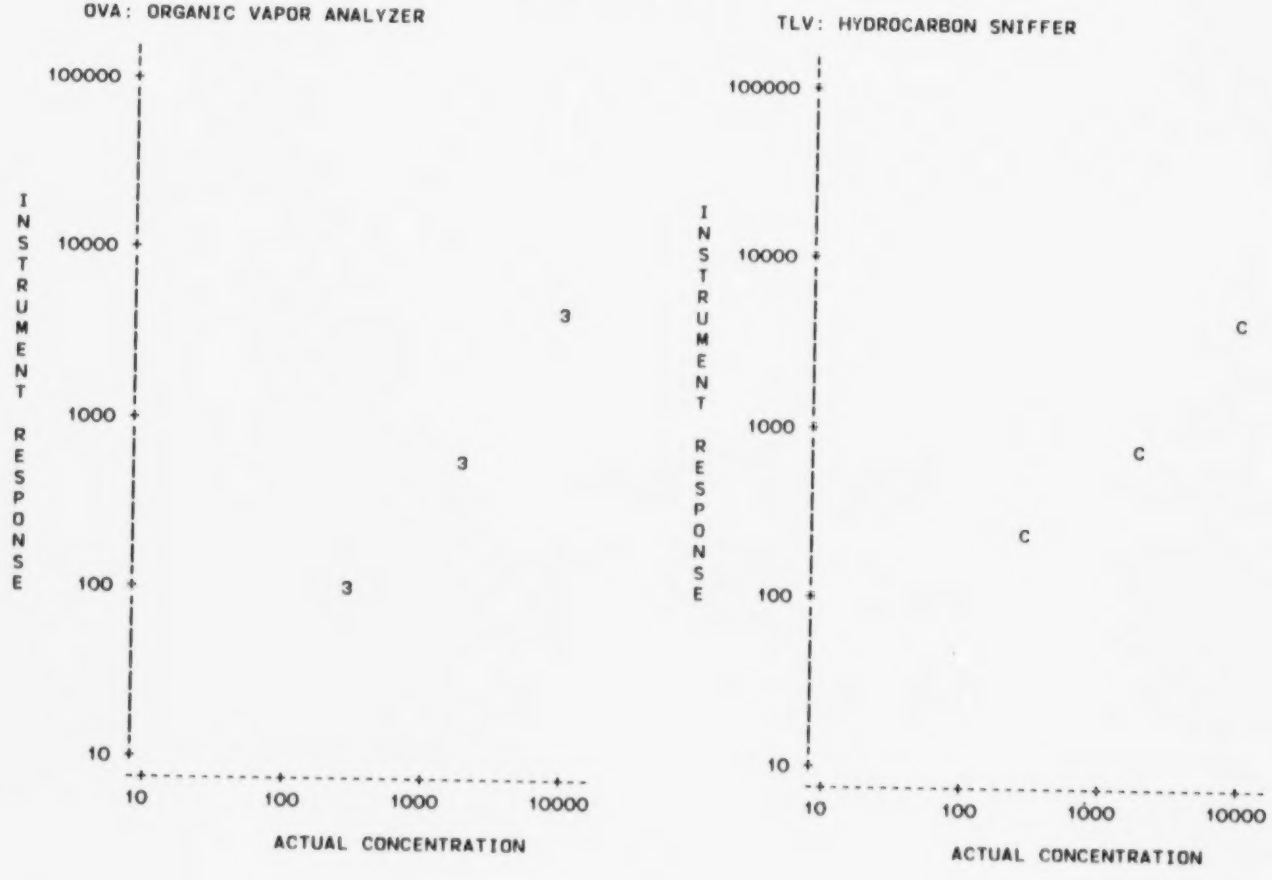


TABLE 5-32

RESPONSE FACTOR SUMMARY

BUTYL ETHER,SEC

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	206	206	206	0.73		1							0.73		1			
1500	1501	1501	1501	0.65		1							0.65		1			
3000	3060	3060	3060	0.33	0.01	2							0.33		1	0.34		1
4000	4209	4209	4209															
6000	6360	6360	6360															
8000	7726	7726	7726															
		OVERALL MEANS		0.51	0.02	4							0.57	0.12	3	0.34		1
	ESTIMATED AT 10,000 PPMV			0.26			95 % CONFIDENCE INTERVAL : (0.11, 0.60)											

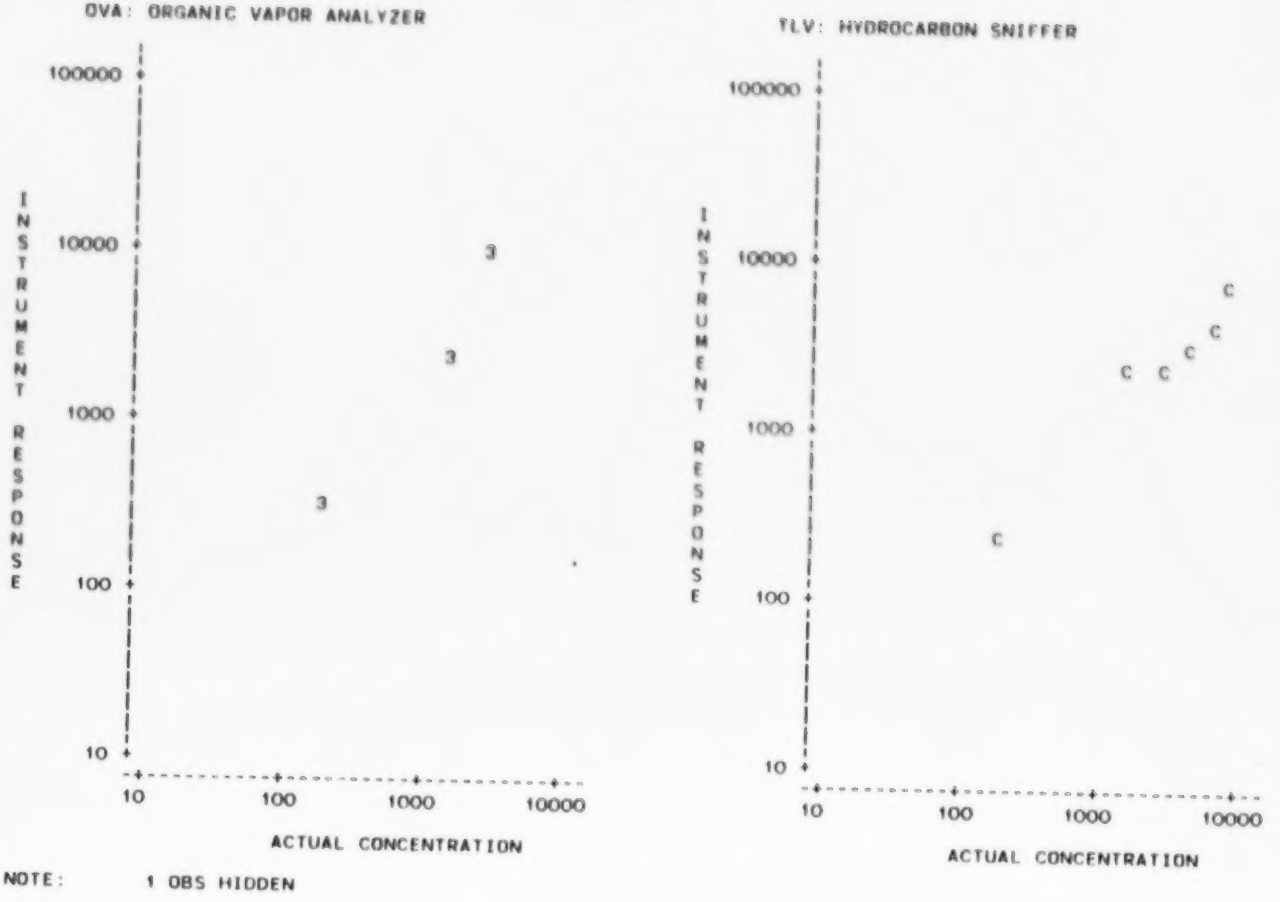
TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	206	206	206	0.82		1				0.82		1						
1500	1501	1501	1501	0.68		1				0.68		1						
3000	3060	3060	3060	1.22		1				1.22		1						
4000	4209	4209	4209	1.15		1				1.15		1						
6000	6360	6360	6360	1.35		1				1.35		1						
8000	7726	7726	7726	0.92		1				0.92		1						
		OVERALL MEANS		1.03		6				1.03	0.11	6						
	ESTIMATED AT 10,000 PPMV			1.13			95 % CONFIDENCE INTERVAL : (0.78, 1.64)											

Figure 5-32

INSTRUMENT RESPONSE VS CONCENTRATION

BUTYL ETHER, SEC



NOTE: 1 OBS HIDDEN

TABLE 5-33

RESPONSE FACTOR SUMMARY

BUTYLAMINE,N-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL	ACTUAL PPMV			OVERALL			OVA METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	217	217	217	1.65	0.06	2	1.71		1	1.60		1						
1500	1505	1505	1505	1.37	0.00	2	1.37		1	1.37		1						
6000	6115	6115	6115	0.64	0.02	2	0.62		1	0.65		1						
8000	7692	7692	7692															
		OVERALL MEANS		1.22	0.00	6	1.24	0.32	3	1.21	0.28	3						

ESTIMATED AT 10,000 PPMV 0.63 95 % CONFIDENCE INTERVAL : (0.43, 0.92)

TLV INSTRUMENTS

RESPONSE FACTORS

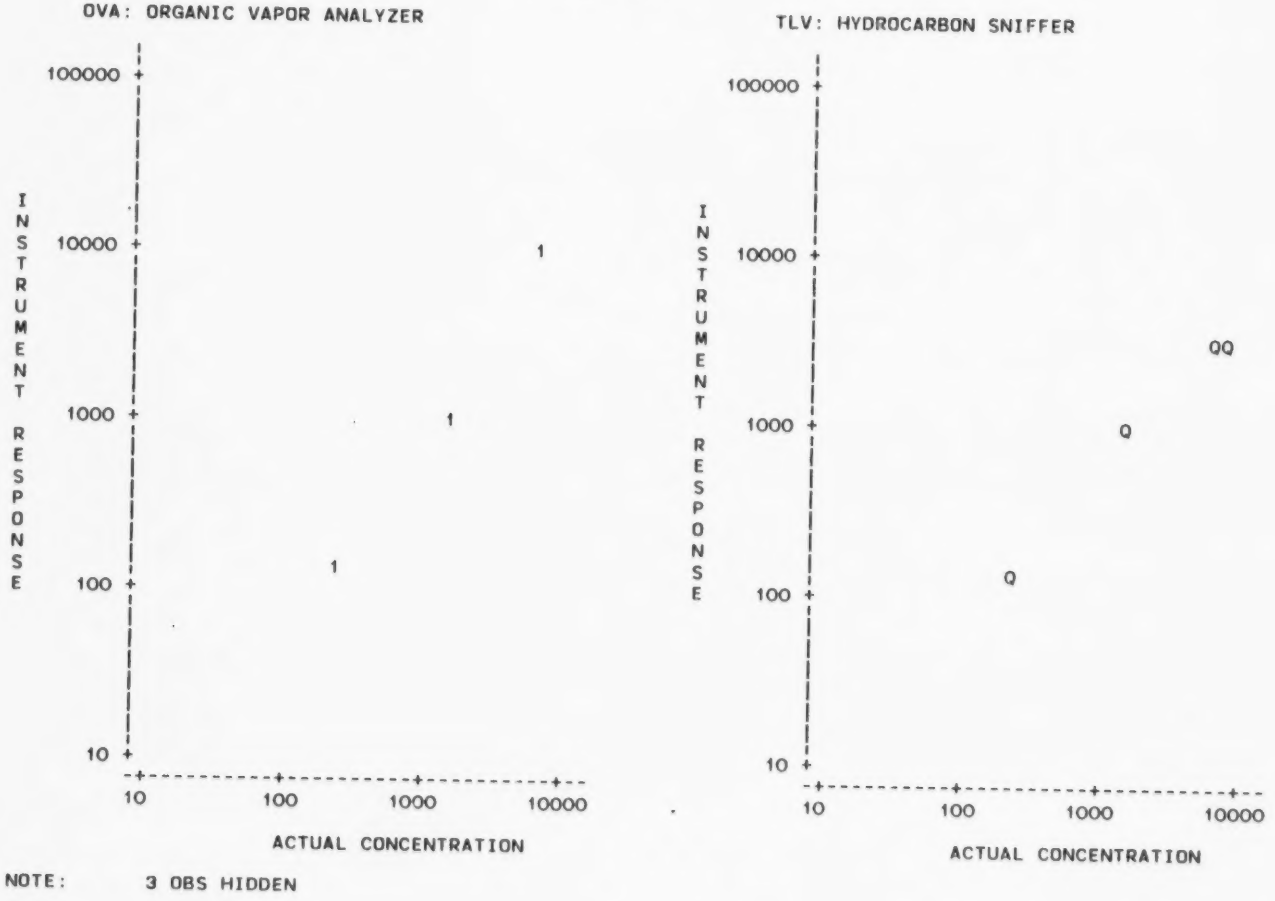
NOMINAL	ACTUAL PPMV			OVERALL			TLV METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	217	217	217	1.51		1										1.51		1
1500	1505	1505	1505	1.52		1										1.52		1
6000	6115	6115	6115	1.66		1										1.66		1
8000	7692	7692	7692	2.22		1										2.22		1
		OVERALL MEANS		1.73		4										1.73	0.17	4

ESTIMATED AT 10,000 PPMV 1.91 95 % CONFIDENCE INTERVAL : (1.38, 2.65)

Figure 5-33

INSTRUMENT RESPONSE VS CONCENTRATION

BUTYLAMINE,N-



NOTE: 3 OBS HIDDEN

TABLE 5-34

RESPONSE FACTOR SUMMARY

BUTYLAMINE,SEC-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	199	199	199	1.10	0.03	2	1.13		1	1.07		1						
1500	1614	1614	1614	1.01	0.00	2	1.01		1	1.01		1						
6000	6445	6445	6445	0.65	0.00	2	0.65		1	0.66		1						
		OVERALL MEANS		0.92	0.00	6	0.93	0.14	3	0.91	0.13	3						

ESTIMATED AT 10,000 PPMV 0.67

95 % CONFIDENCE INTERVAL : (0.53, 0.84)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	199	199	199	1.06		1										1.06		1
1500	1614	1614	1614	1.35		1										1.35		1
6000	6445	6445	6445	1.41		1										1.41		1
		OVERALL MEANS		1.27		3										1.27	0.11	3

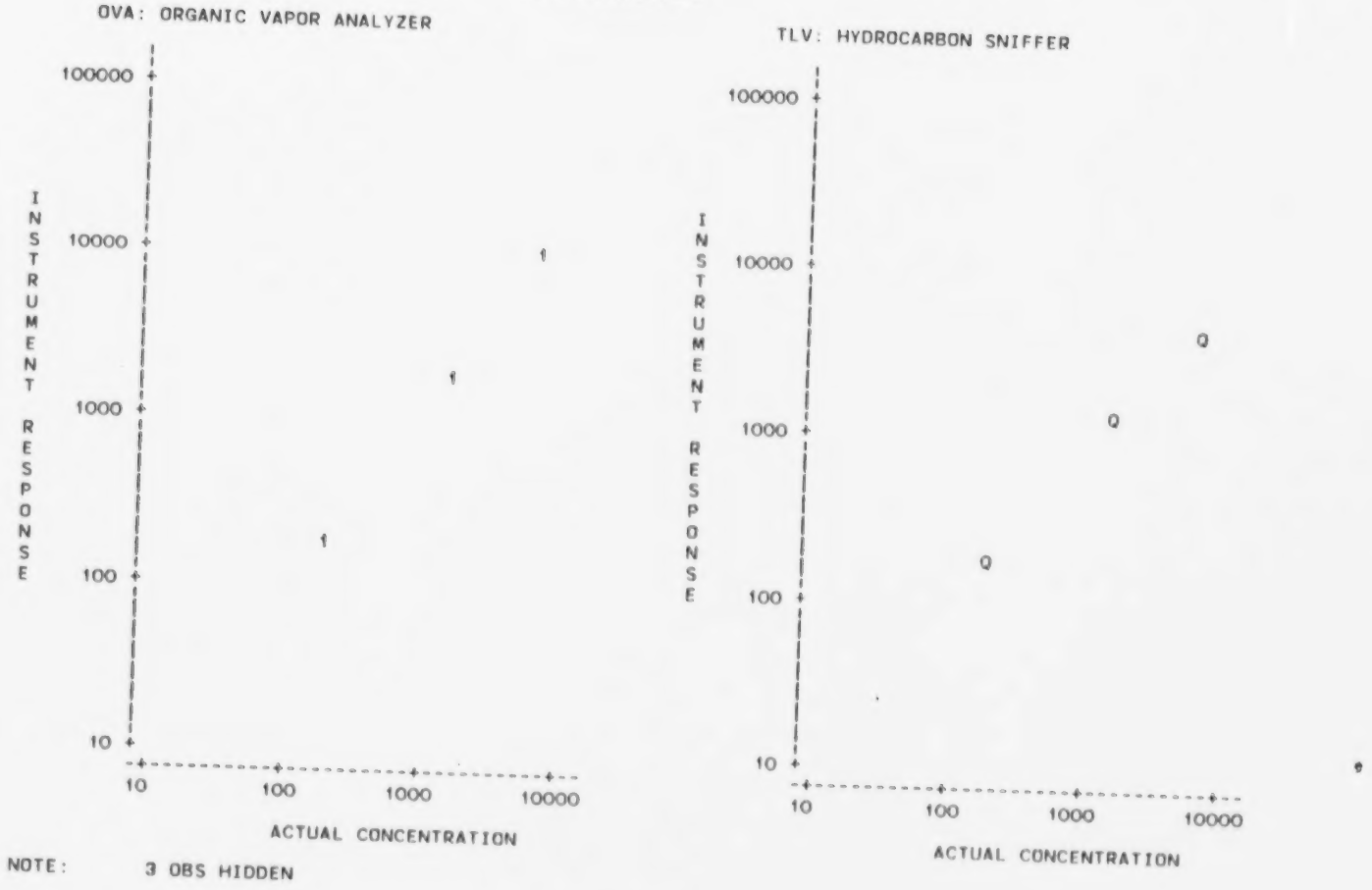
ESTIMATED AT 10,000 PPMV 1.50

95 % CONFIDENCE INTERVAL : (1.26, 1.79)

Figure 5-34

INSTRUMENT RESPONSE VS CONCENTRATION

BUTYLAMINE, SEC-



NOTE: 3 OBS HIDDEN

TABLE 5-35

RESPONSE FACTOR SUMMARY

BUTYLAMINE, TERT-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	224	224	224	1.18	0.02	2	1.21		1	1.16		1						
1500	1646	1646	1646	0.87	0.05	2	0.82		1	0.92		1						
6000	6125	6125	6125	0.62	0.00	2	0.62		1	0.62		1						
8000	8042	8042	8042															
		OVERALL MEANS		0.89	0.00	6	0.88	0.17	3	0.90	0.15	3						

ESTIMATED AT 10,000 PPMV 0.58

95 % CONFIDENCE INTERVAL : (0.52, 0.65)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	224	224	224	1.10		1										1.10		1
1500	1646	1646	1646	1.58		1										1.58		1
6000	6125	6125	6125	1.72		1										1.72		1
8000	8042	8042	8042	1.67		1										1.67		1
		OVERALL MEANS		1.52		4										1.52	0.14	4

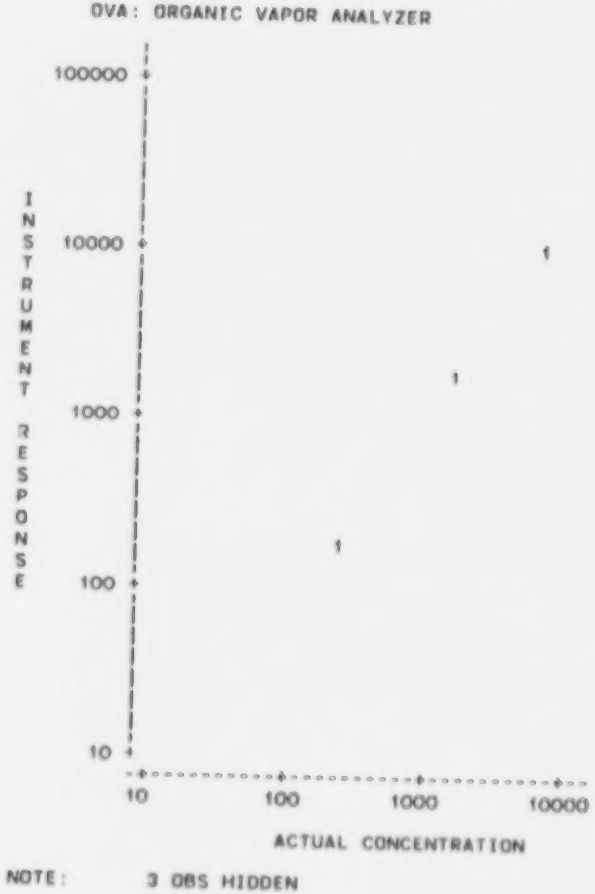
ESTIMATED AT 10,000 PPMV 1.80

95 % CONFIDENCE INTERVAL : (1.53, 2.11)

Figure 5-35

INSTRUMENT RESPONSE VS CONCENTRATION

BUTYLAMINE, TERT-



NOTE: 3 OBS HIDDEN

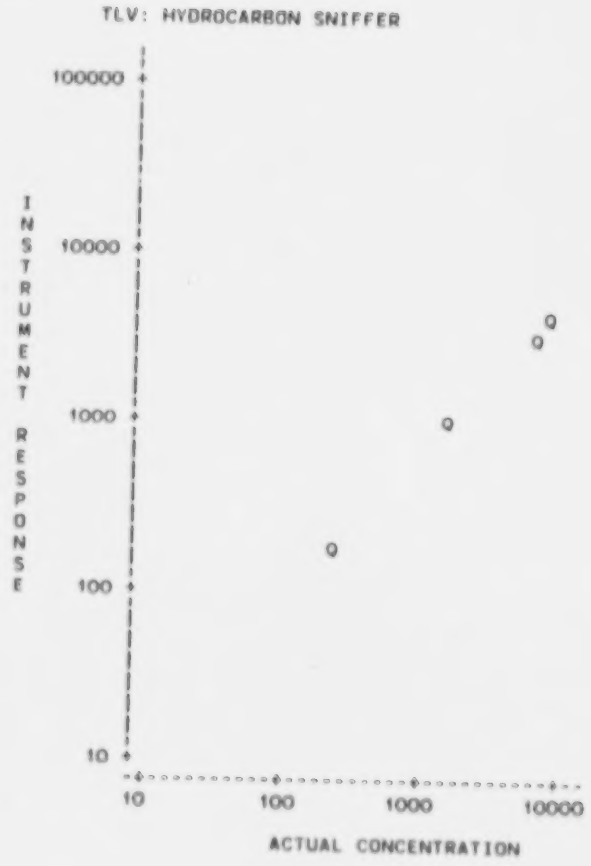


TABLE 5-36

RESPONSE FACTOR SUMMARY

BUTYLBENZENE,TERT-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	196	196	196	0.83	0.11	2
1500	1580	1580	1580	0.85	0.06	2
8000	8033	8033	8033	1.39	0.00	2
		OVERALL MEANS		1.02	0.01	6
		ESTIMATED AT 10,000 PPMV		1.27		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
0.72		1	0.94		1						
0.79		1	0.91		1						
1.39		1	1.39		1						
0.97	0.21	3	1.08	0.15	3						

95 % CONFIDENCE INTERVAL : (0.94, 1.73)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	196	196	196	1.36	0.86	2
1500	1580	1580	1580	4.45	2.35	2
8000	8033	8033	8033	9.85	6.48	2
		OVERALL MEANS		5.22	0.52	6
		ESTIMATED AT 10,000 PPMV		6.42		

RESPONSE FACTORS

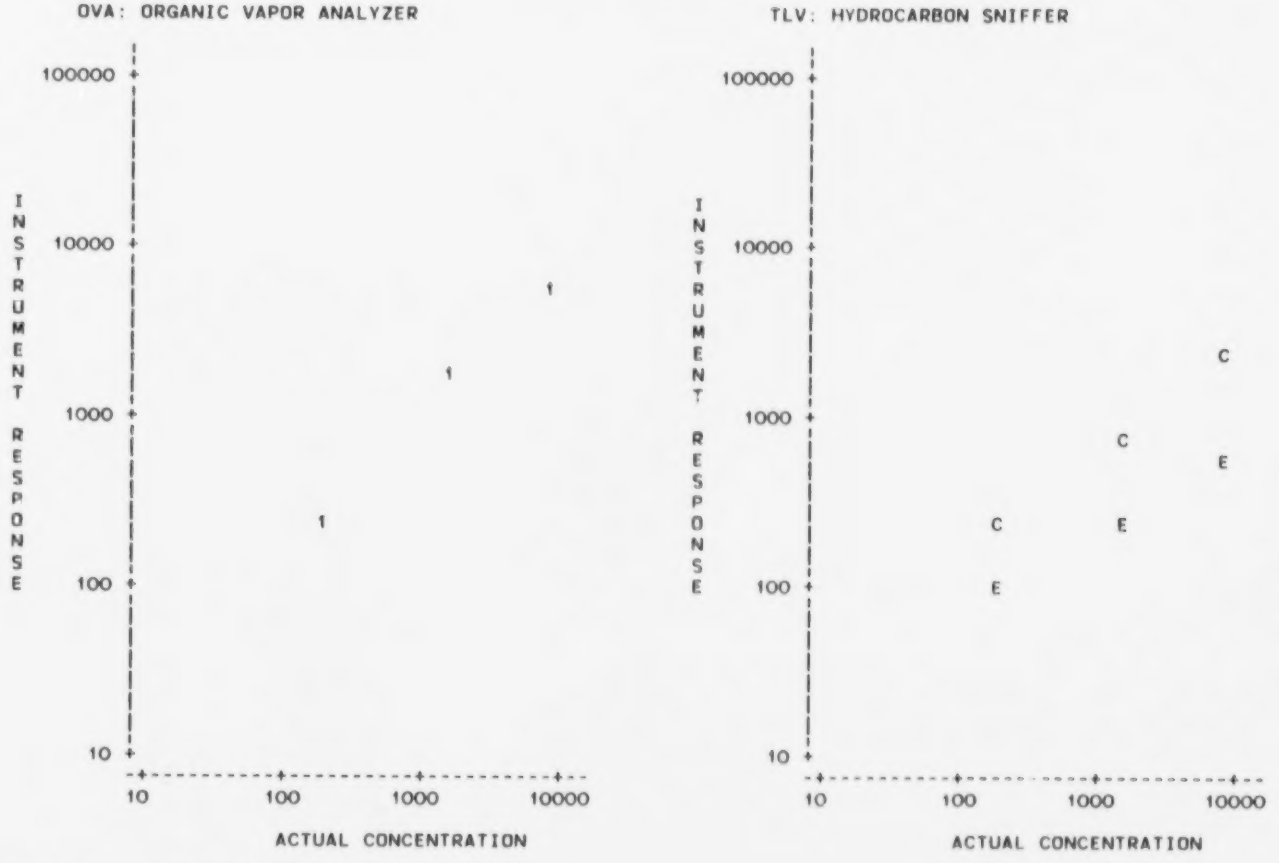
TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7O	SE	N
1.91		1	0.80		1						
6.80		1	2.11		1						
16.32		1	3.37		1						
8.35	4.23	3	2.09	0.74	3						

95 % CONFIDENCE INTERVAL : (1.82,22.67)

Figure 5-36

INSTRUMENT RESPONSE VS CONCENTRATION

BUTYLBENZENE,TERT-



NOTE: 3 OBS HIDDEN

TABLE 5-37

RESPONSE FACTOR SUMMARY

BUTYRALDEHYDE N-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	243	243	243	3.66	0.14	2	3.52		1	3.80		1						
1500	1605	1605	1605	2.67	0.05	2	2.62		1	2.72		1						
8000	8119	8119	8119	1.37	0.02	2	1.35		1	1.39		1						
		OVERALL MEANS		2.57	0.01	6	2.50	0.63	3	2.63	0.70	3						

ESTIMATED AT 10,000 PPMV 1.39

95 % CONFIDENCE INTERVAL : (1.12, 1.71)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	243	243	243	0.77		1										0.77		1
1500	1605	1605	1605	1.28		1										1.28		1
8000	8119	8119	8119	1.76		1										1.76		1
		OVERALL MEANS		1.27		3										1.27	0.28	3

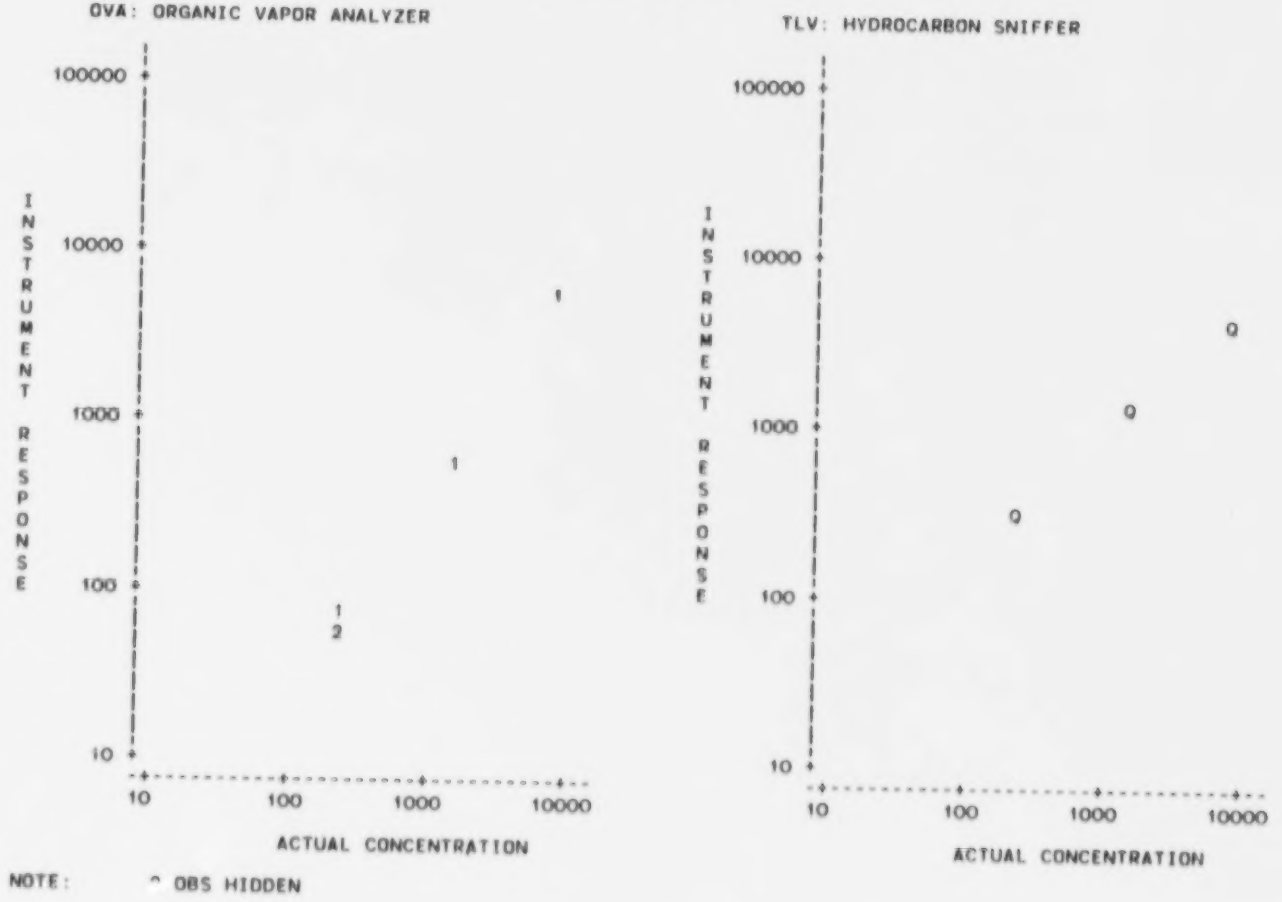
ESTIMATED AT 10,000 PPMV 1.89

95 % CONFIDENCE INTERVAL : (1.60, 2.23)

Figure 5-37

INSTRUMENT RESPONSE VS CONCENTRATION

BUTYRALDEHYDE N-



NOTE: ^ OBS HIDDEN

TABLE 5-38

RESPONSE FACTOR SUMMARY

BUTYRIC ACID

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	208	208	208	3.04	0.17	2	2.87		1	3.20		1						
350	357	357	357	2.33	0.14	2	2.19		1	2.48		1						
500	550	550	550	2.19	0.38	2	1.81		1	2.57		1						
			OVERALL MEANS	2.52	0.04	6	2.29	0.31	3	2.75	0.23	3						

ESTIMATED AT 10,000 PPMV 0.74

95 % CONFIDENCE INTERVAL : (0.22, 2.52)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	208	208	208	1.10		1										1.10		1
350	357	357	357	1.28		1										1.28		1
500	550	550	550	1.59		1										1.59		1
			OVERALL MEANS	1.32		3										1.32	0.14	3

ESTIMATED AT 10,000 PPMV 4.58

95 % CONFIDENCE INTERVAL : (2.39, 8.78)

Figure 5-38

INSTRUMENT RESPONSE VS CONCENTRATION

BUTYRIC ACID

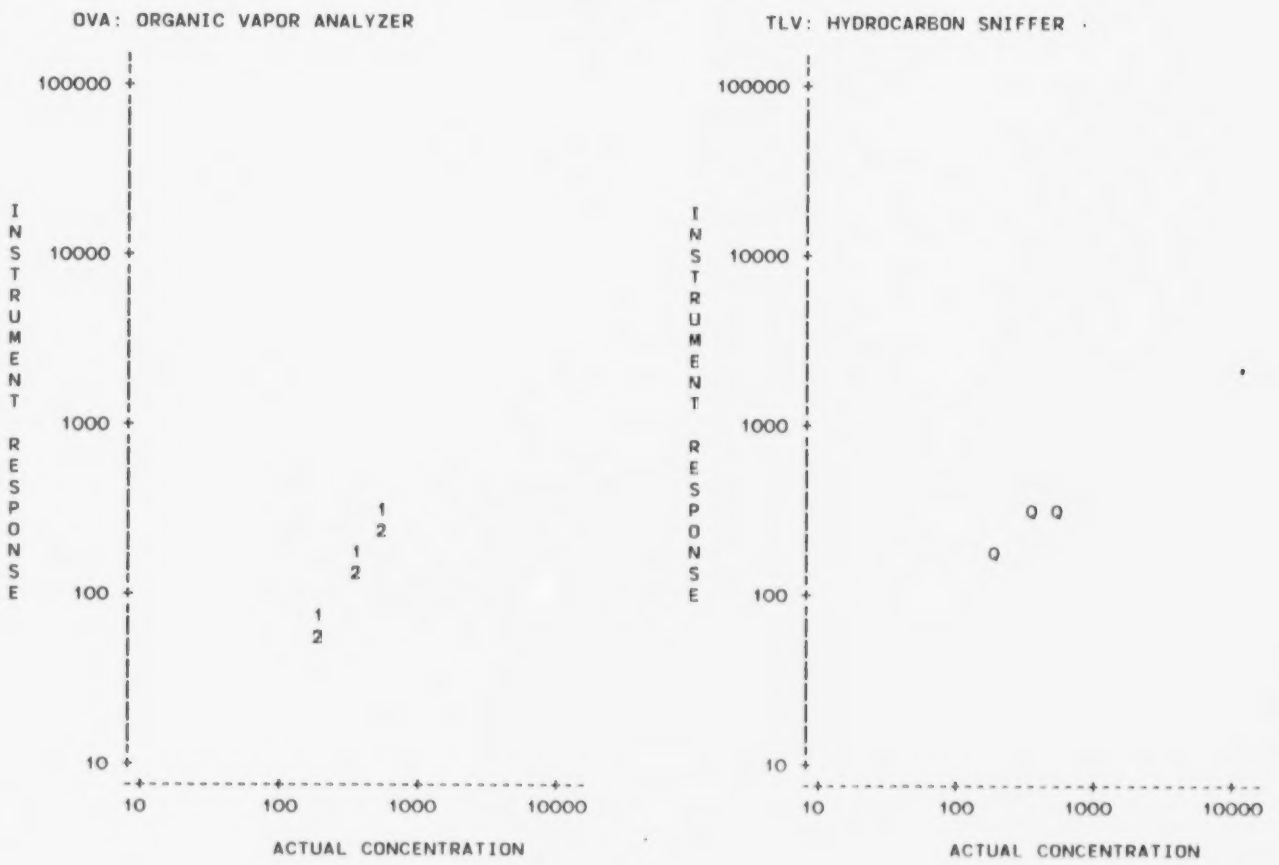


TABLE 5-39

RESPONSE FACTOR SUMMARY

BUTYRONITRILE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	238	238	238	0.89	0.17	2
1500	1491	1491	1491	0.79	0.04	2
5000	4711	4711	4711	0.49	0.01	2
8000	7331	7331	7331			
			OVERALL MEANS	0.72	0.01	6
			ESTIMATED AT 10,000 PPMV	0.46		

RESPONSE FACTORS

OVA METERS											
1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
						0.72		1	1.07		1
						0.75		1	0.83		1
						0.49		1	0.50		1
						0.65	0.08	3	0.80	0.17	3

95 % CONFIDENCE INTERVAL : (0.31, 0.70)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	238	238	238	0.91		1
1500	1491	1491	1491	1.60		1
5000	4711	4711	4711			
8000	7331	7331	7331	1.18		1
			OVERALL MEANS	1.23		3
			ESTIMATED AT 10,000 PPMV	1.33		

RESPONSE FACTORS

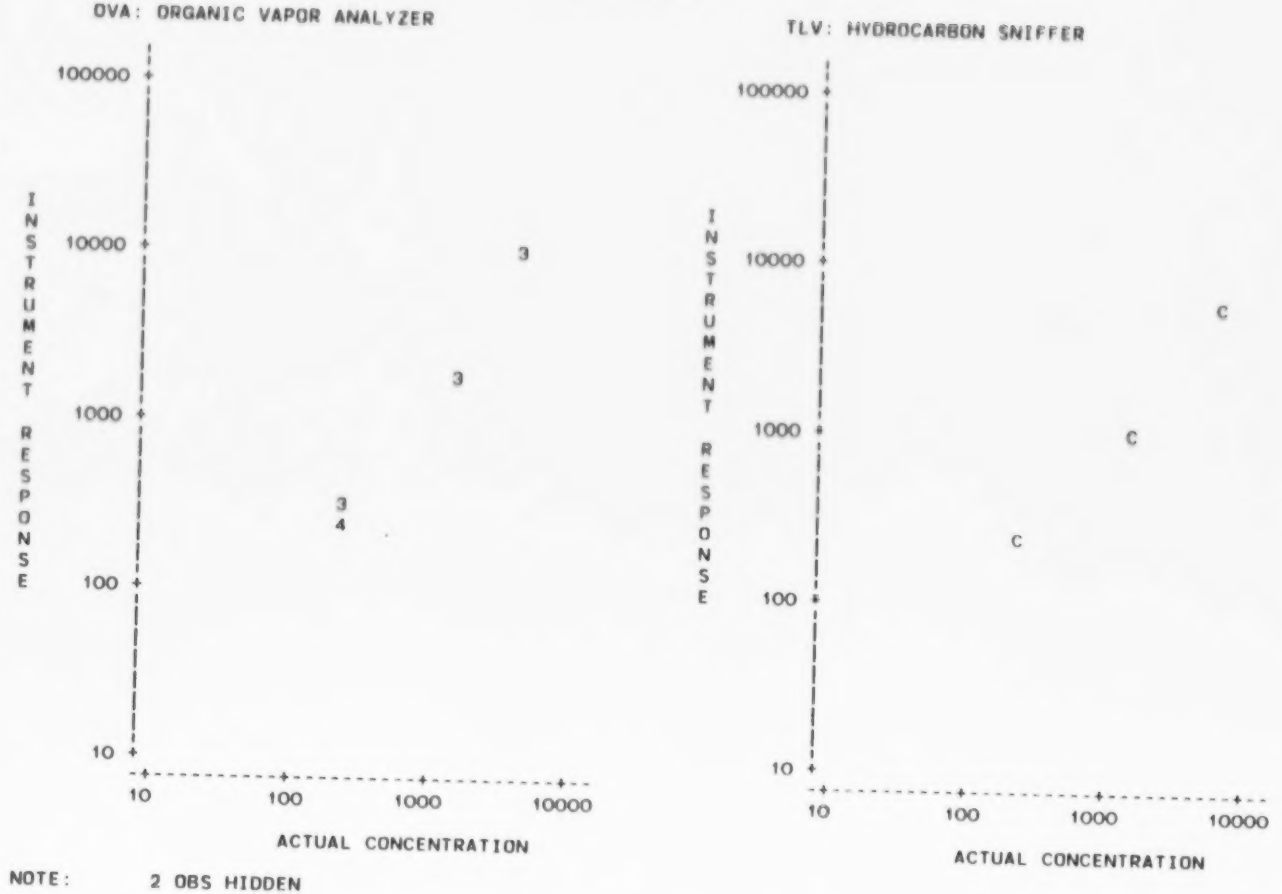
TLV METERS											
7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
			0.91		1						
			1.60		1						
			1.18		1						
			1.23	0.20	3						

95 % CONFIDENCE INTERVAL : (0.44, 3.99)

Figure 5-39

INSTRUMENT RESPONSE VS CONCENTRATION

BUTYRONITRILE



NOTE: 2 OBS HIDDEN

TABLE 5-40

RESPONSE FACTOR SUMMARY

CARBON DISULFIDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	218	218	218	127.3	18.2	2	109.1		1	145.5		1						
1500	1510	1510	1510	184.8	47.5	2	137.3		1	232.4		1						
8000	7814	7814	7814	703.5	165	2	538.9		1	868.2		1						
			OVERALL MEANS	338.6	12.8	6	261.8	139	3	415.4	228	3						

ESTIMATED AT 10,000 PPMV 571.9

95 % CONFIDENCE INTERVAL : (279.6, 1170)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	218	218	218	1.37		1										1.37		1
1500	1510	1510	1510	1.94		1										1.94		1
8000	7814	7814	7814	2.86		1										2.86		1
			OVERALL MEANS	2.06		3										2.06	0.44	3

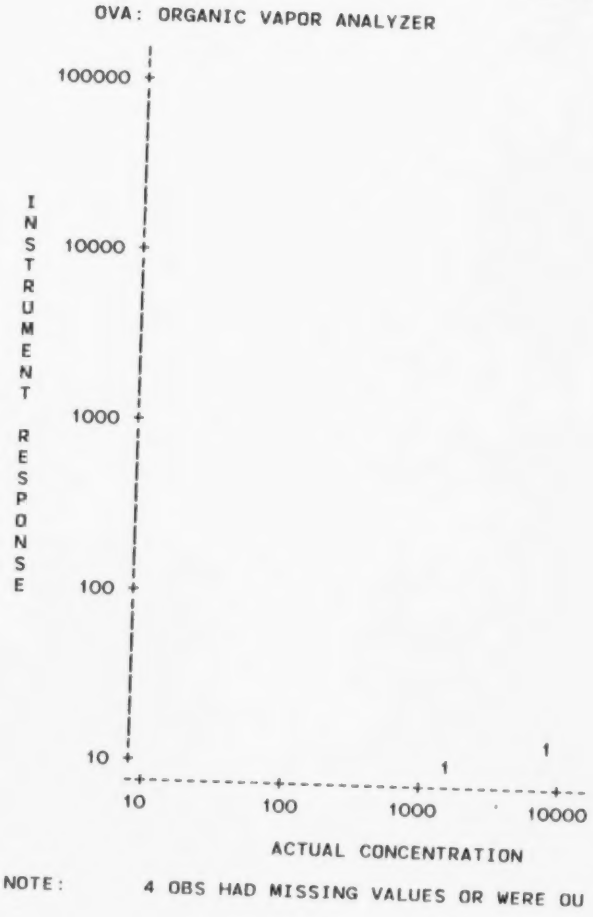
ESTIMATED AT 10,000 PPMV 2.96

95 % CONFIDENCE INTERVAL : (2.62, 3.34)

Figure 5-40

INSTRUMENT RESPONSE VS CONCENTRATION

CARBON DISULFIDE



NOTE: 4 OBS HAD MISSING VALUES OR WERE OU

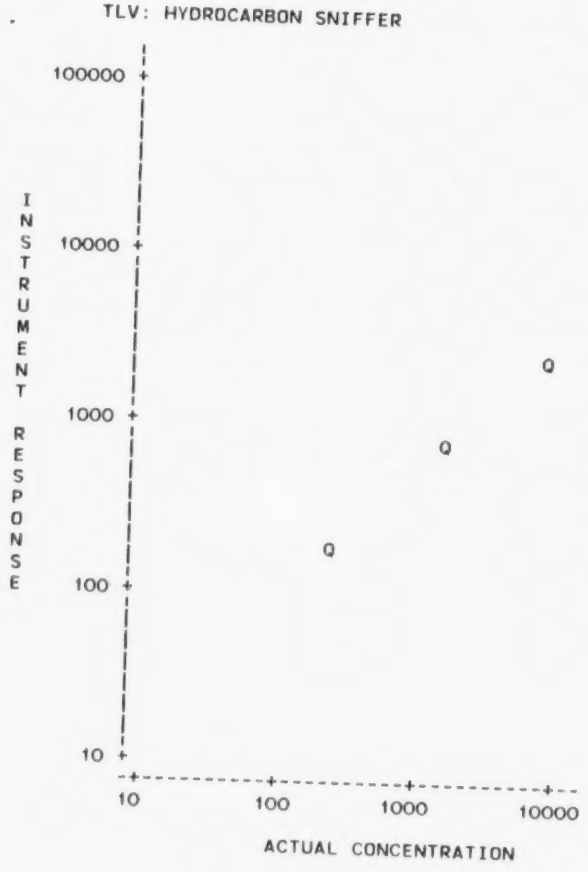


TABLE 5-41

RESPONSE FACTOR SUMMARY

CARBON TETRACHLORIDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	197	197	197	1.99	0.06	2	1.93		1	2.05		1						
1500	1551	1551	1551	12.56	0.81	2	11.75		1	13.37		1						
8000	8011	8011	8011	15.77	0.68	2	16.45		1	15.09		1						
OVERALL MEANS				10.11	0.01	6	10.04	4.28	3	10.17	4.09	3						

ESTIMATED AT 10,000 PPMV 21.28

95 % CONFIDENCE INTERVAL : (10.95,41.36)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	197	197	197	0.84	0.12	2	0.96		1	0.72		1						
1500	1551	1551	1551	16.94	7.73	2	24.67		1	9.21		1						
8000	8011	8011	8011	22.82	5.77	2	28.59		1	17.04		1						
OVERALL MEANS				13.53	0.76	6	18.07	8.63	3	8.99	4.71	3						

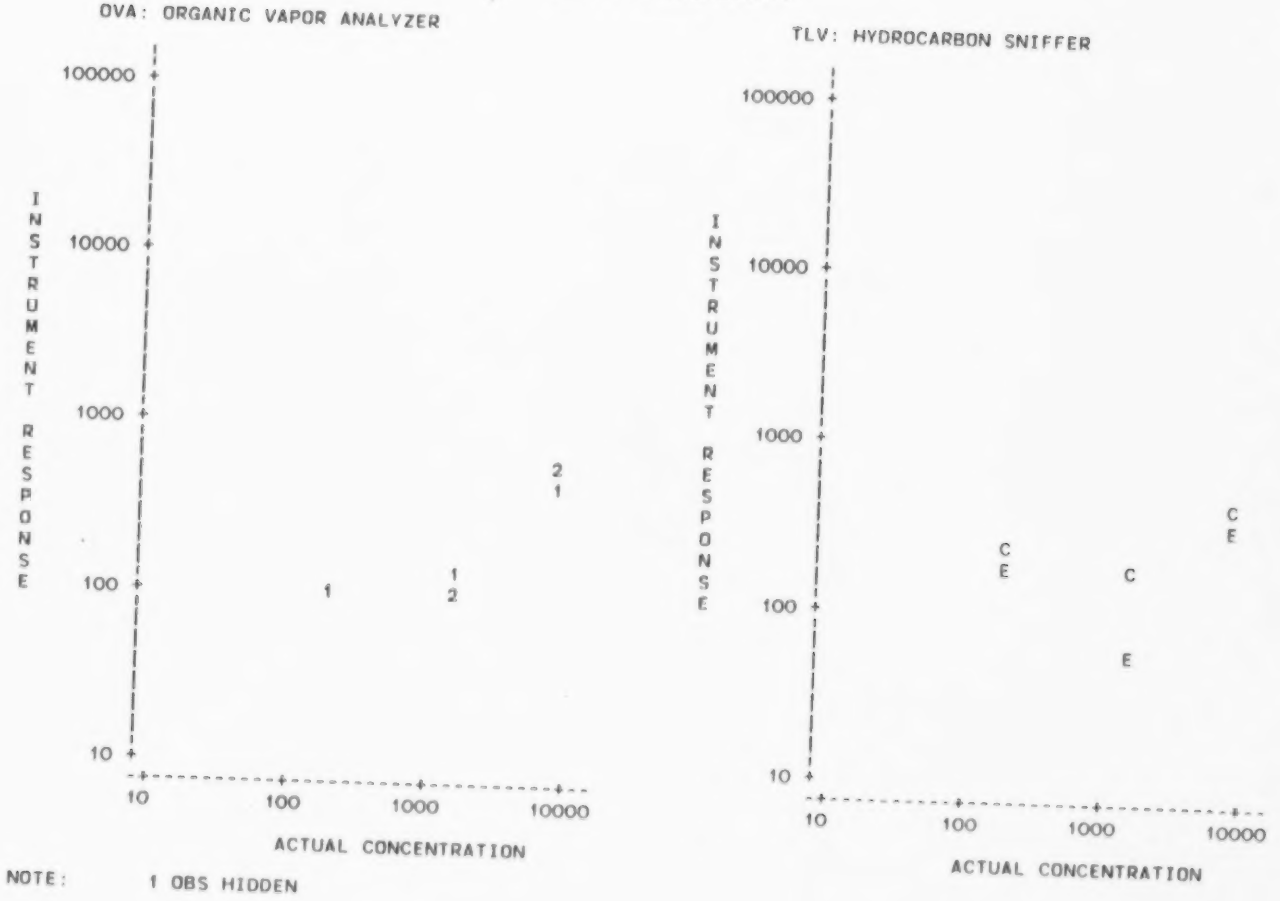
ESTIMATED AT 10,000 PPMV 30.52

95 % CONFIDENCE INTERVAL : (8.96,103.9)

Figure 5-41

INSTRUMENT RESPONSE VS CONCENTRATION

CARBON TETRACHLORIDE



NOTE: 1 OBS HIDDEN

TABLE 5-42

RESPONSE FACTOR SUMMARY

CHLOROACETALDEHYDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	240	240	240	29.19	5.15	2	24.04		1	34.34		1						
1000	1011	1011	1011	21.52	0.46	2	21.06		1	21.97		1						
1500	1473	1473	1473	14.98	0.53	2	14.44		1	15.51		1						
8000	8185	8185	8185	15.75	0.79	2	14.96		1	16.53		1						
			OVERALL MEANS	20.36	0.22	8	18.63	2.35	4	22.09	4.32	4						

ESTIMATED AT 10.000 PPMV 13.40 95 % CONFIDENCE INTERVAL : (9.65,18.24)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	240	240	240	5.19	0.68	2	5.86		1	4.51		1						
1000	1011	1011	1011	6.02	1.52	2	7.55		1	4.50		1						
1500	1473	1473	1473	4.65	0.61	2	5.26		1	4.04		1						
8000	8185	8185	8185	5.28	0.42	2	5.70		1	4.86		1						
			OVERALL MEANS	5.28	0.10	8	6.09	0.50	4	4.48	0.17	4						

ESTIMATED AT 10.000 PPMV 5.07 95 % CONFIDENCE INTERVAL : (3.65, 7.06)

Figure 5-42

INSTRUMENT RESPONSE VS CONCENTRATION

CHLOROACETALDEHYDE

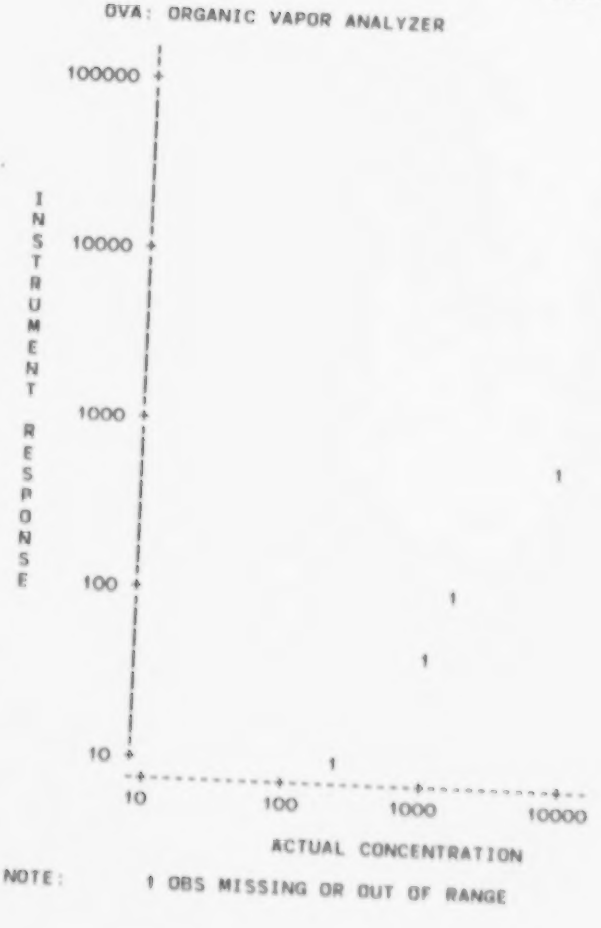


TABLE 5-43

RESPONSE FACTOR SUMMARY

CHLOROBENZENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N
200	211	224	217	0.45	0.03	4
1500	1492	1557	1524	0.36	0.01	4
3000	2900	2957	2928	0.46	0.00	2
7000	7020	7020	7020			
8000	8096	8096	8096			
			OVERALL MEANS	0.42	0.00	10
			ESTIMATED AT 10,000 PPMV	0.38		

RESPONSE FACTORS

OVA METERS 1080	SE	N	3254	SE	N	2159	SE	N	1813	SE	N
0.47		1	0.45		1	0.38		1	0.51		1
0.38		1	0.38		1	0.32		1	0.35		1
0.47		1	0.46		1						
0.44	0.03	3	0.43	0.03	3	0.35	0.03	2	0.43	0.08	2

95 % CONFIDENCE INTERVAL : (0.28, 0.48)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N
200	211	224	217	0.81	0.09	3
1500	1492	1557	1524	0.85	0.05	3
3000	2900	2957	2928	0.89	0.08	2
7000	7020	7020	7020	0.81		1
8000	8096	8096	8096	0.89	0.04	2
			OVERALL MEANS	0.85	0.00	11
			ESTIMATED AT 10,000 PPMV	0.88		

RESPONSE FACTORS

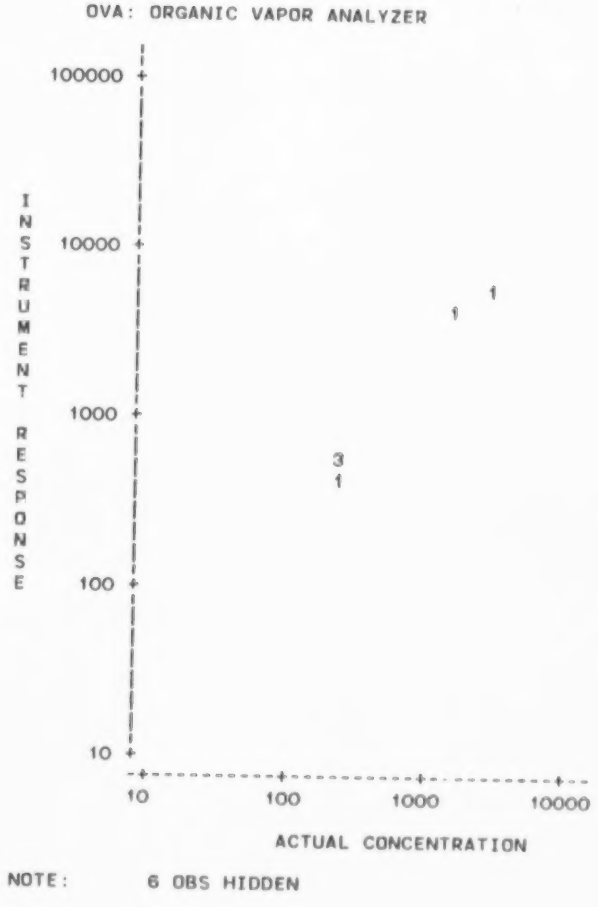
TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
			0.85		1	0.94		1	0.65		1
			0.83		1	0.94		1	0.78		1
			0.81		1				0.97		1
			0.81		1						
						0.93		1	0.86		1
			0.82	0.01	4	0.94	0.00	3	0.81	0.07	4

95 % CONFIDENCE INTERVAL : (0.77, 1.00)

Figure 5-43

INSTRUMENT RESPONSE VS CONCENTRATION

CHLOROBENZENE



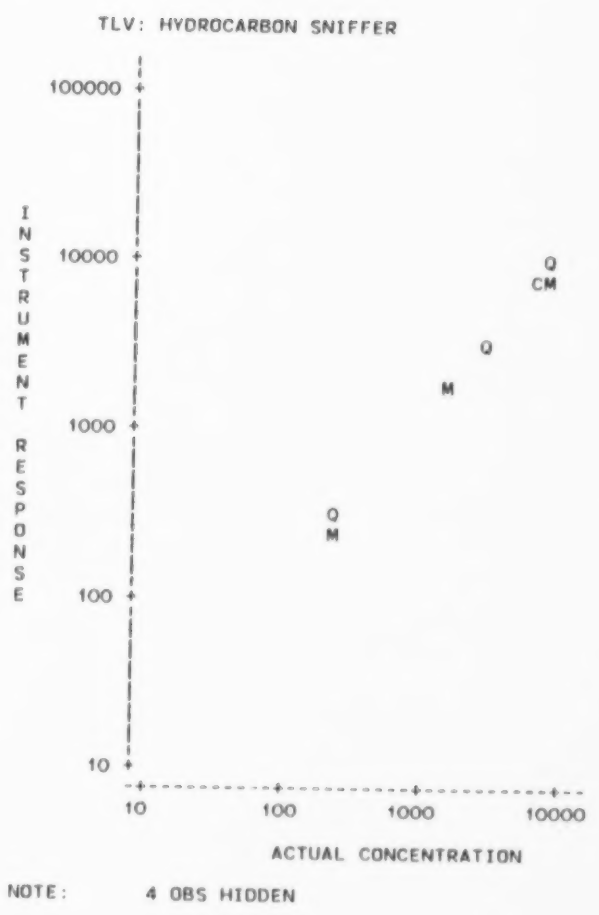


TABLE 5-44

RESPONSE FACTOR SUMMARY

CHLOROETHANE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	10	10	10	0.32	0.04	2	0.36		1	0.29		1						
500	724	724	724	211.1	30.2	2	180.9		1	241.2		1						
1500	1540	1540	1540	2.27	0.54	2	2.81		1	1.74		1						
8000	3430	3430	3430	1.81	0.41	2	2.22		1	1.40		1						
		OVERALL MEANS		53.87	0.91	8	46.57	44.8	4	61.16	60	4						

ESTIMATED AT 10,000 PPMV 0.67 95 % CONFIDENCE INTERVAL : (0.02,22.54)

TLV INSTRUMENTS

RESPONSE FACTORS

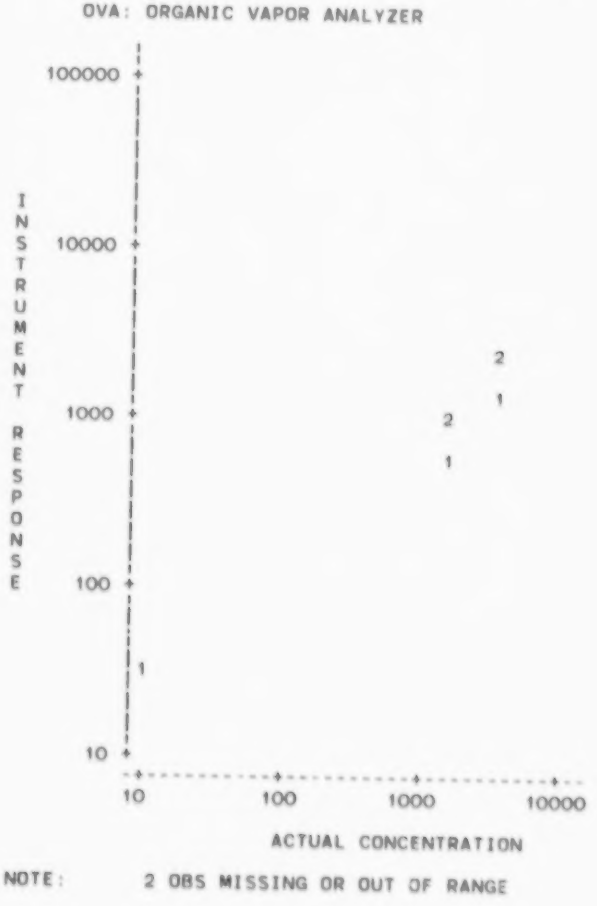
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	10	10	10	0.16	0.03	2	0.19		1	0.13		1						
500	724	724	724	13.39	2.41	2	15.80		1	10.97		1						
1500	1540	1540	1540	1.45	0.00	2	1.45		1	1.45		1						
8000	3430	3430	3430	1.22	0.00	2	1.22		1	1.22		1						
		OVERALL MEANS		4.06	0.08	8	4.67	3.72	4	3.44	2.53	4						

ESTIMATED AT 10,000 PPMV 2.16 95 % CONFIDENCE INTERVAL : (0.31,14.95)

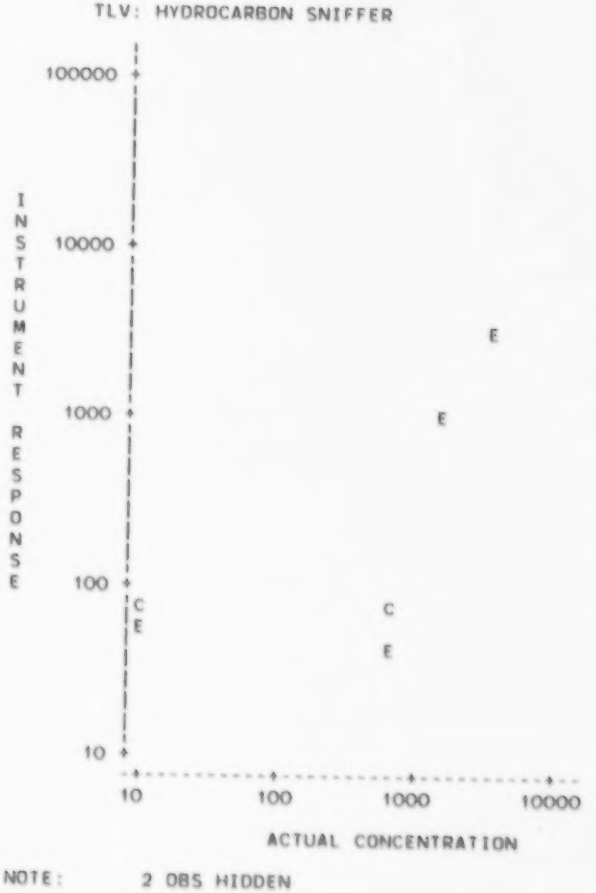
Figure 5-44

INSTRUMENT RESPONSE VS CONCENTRATION

CHLOROETHANE



NOTE: 2 OBS MISSING OR OUT OF RANGE



NOTE: 2 OBS HIDDEN

TABLE 5-45

RESPONSE FACTOR SUMMARY

CHLOROFORM

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	222	222	222	1.39	0.05	2	1.35		1	1.44		1						
1500	1525	1525	1525	2.11	0.03	2	2.08		1	2.14		1						
8000	8550	8550	8550	4.64	0.12	2	4.76		1	4.51		1						
			OVERALL MEANS	2.71	0.00	6	2.73	1.04	3	2.70	0.93	3						

ESTIMATED AT 10,000 PPMV 4.48

95 % CONFIDENCE INTERVAL : (3.60, 5.56)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	222	222	222	2.03	0.23	2	2.26		1	1.80		1						
1500	1525	1525	1525	6.07	0.90	2	6.97		1	5.18		1						
8000	8550	8550	8550	7.47	0.25	2	7.72		1	7.21		1						
			OVERALL MEANS	5.19	0.08	6	5.65	1.71	3	4.73	1.58	3						

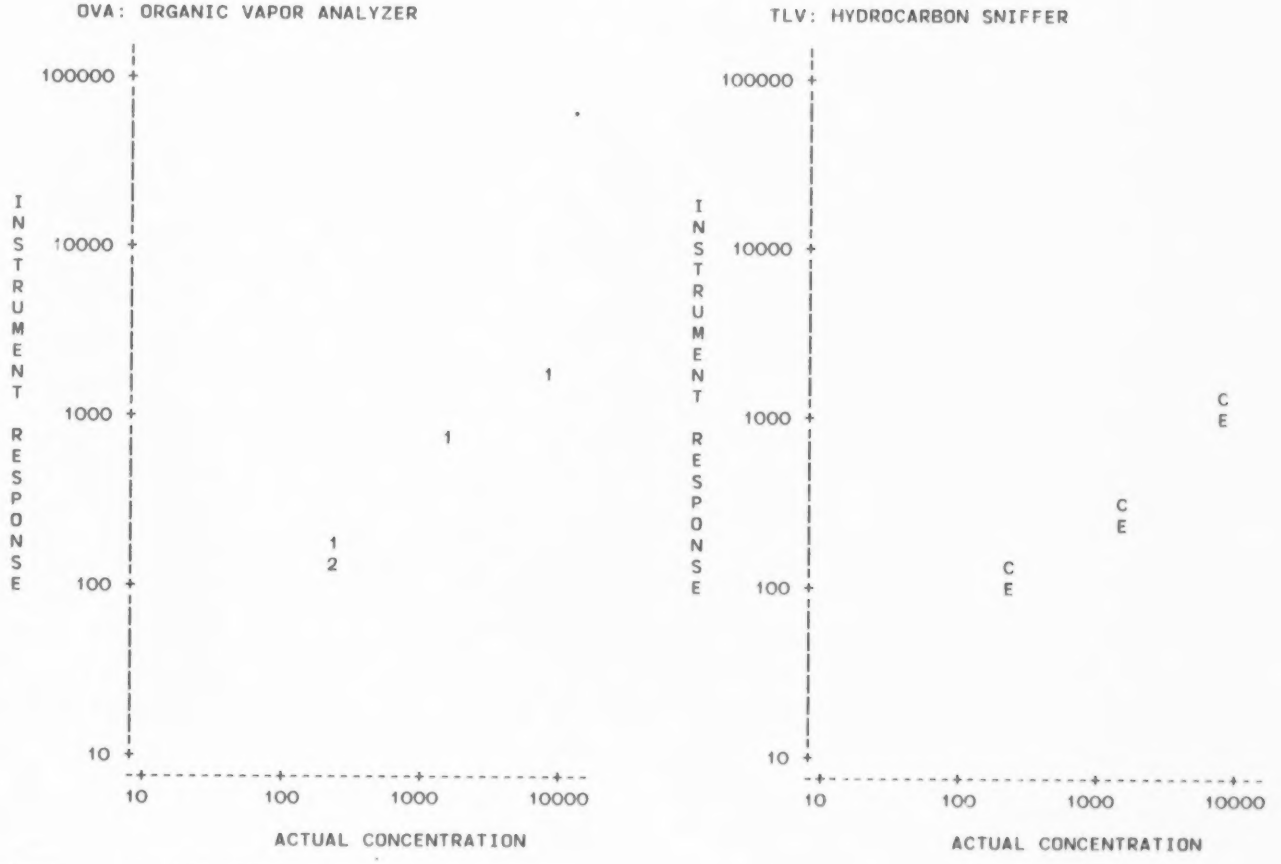
ESTIMATED AT 10,000 PPMV 8.77

95 % CONFIDENCE INTERVAL : (5.65,13.64)

Figure 5-45

INSTRUMENT RESPONSE VS CONCENTRATION

CHLOROFORM



NOTE: 2 OBS HIDDEN

TABLE 5-46

RESPONSE FACTOR SUMMARY

CHLOROPHENOL,O-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	216	216	216	1.65	0.13	2	1.52		1	1.78		1						
1000	1033	1033	1033	1.72	0.02	2	1.70		1	1.73		1						
2000	2147	2147	2147	2.87	0.17	2	3.04		1	2.70		1						
	OVERALL MEANS			2.08	0.00	6	2.09	0.48	3	2.07	0.31	3						

ESTIMATED AT 10,000 PPMV 3.33 95 % CONFIDENCE INTERVAL : (1.88, 5.92)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7O	SE	N
200	216	216	216	1.29		1										1.29		1
1000	1033	1033	1033	2.05		1										2.05		1
2000	2147	2147	2147	3.47		1										3.47		1
	OVERALL MEANS			2.27		3										2.27	0.64	3

ESTIMATED AT 10,000 PPMV 5.87 95 % CONFIDENCE INTERVAL : (2.45, 14.06)

Figure 5-46

INSTRUMENT RESPONSE VS CONCENTRATION

CHLOROPHENOL,O-

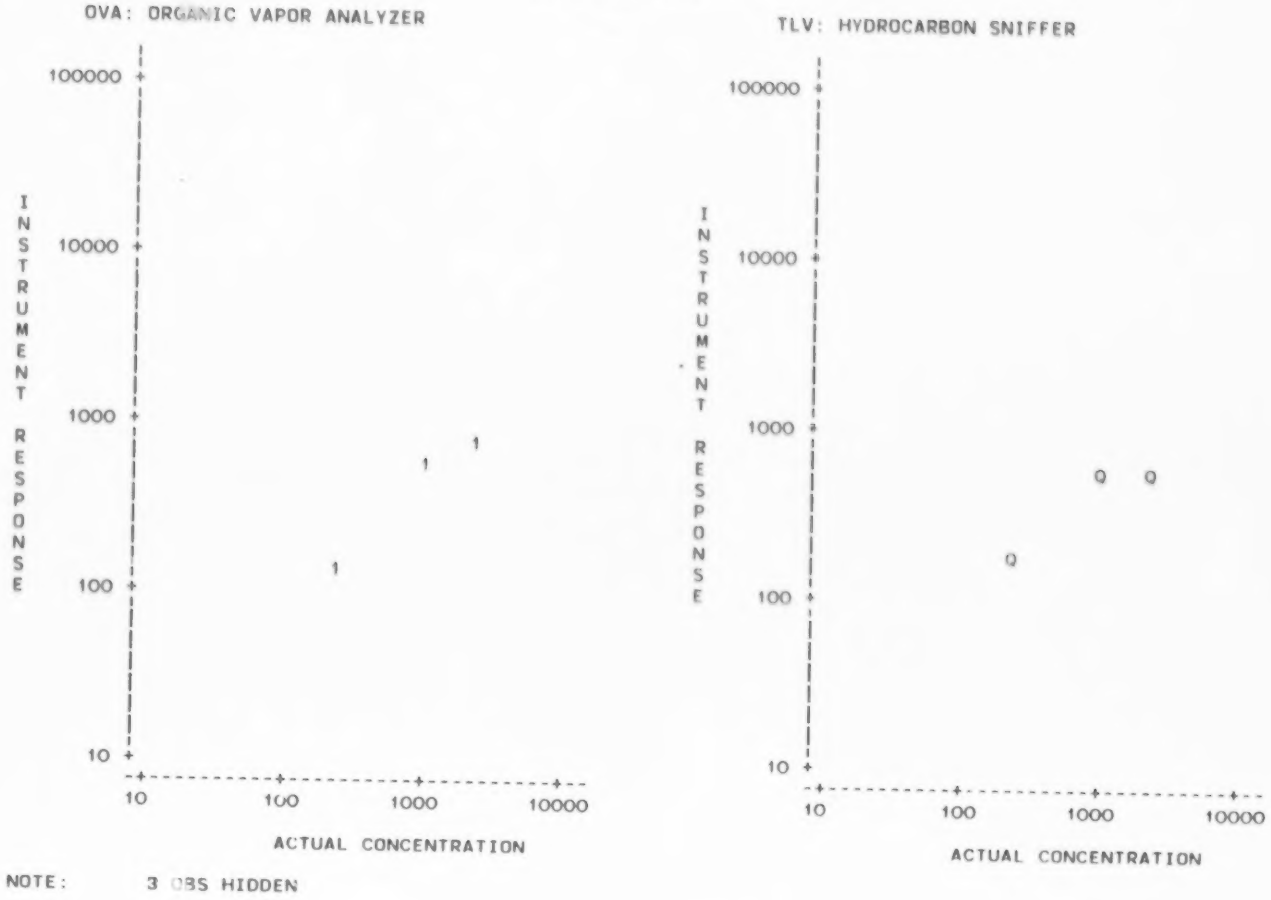


TABLE 5-47

RESPONSE FACTOR SUMMARY

CHLOROPROPENE, 1-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	223	223	223	1.82	0.09	2	1.73		1	1.92		1						
1500	1359	1359	1359	1.14	0.06	2	1.09		1	1.20		1						
5000	4687	4687	4687	0.74	0.05	2	0.69		1	0.79		1						
7000	6482	6482	6482															
8000	7742	7742	7742	0.62		1				0.62		1						
			OVERALL MEANS	1.15	0.00	7	1.17	0.30	3	1.13	0.29	4						

ESTIMATED AT 10,000 PPMV 0.59 95 % CONFIDENCE INTERVAL : (0.53, 0.66)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	223	223	223	1.56	0.01	2	1.57		1	1.56		1						
1500	1359	1359	1359	1.27	0.05	2	1.32		1	1.23		1						
5000	4687	4687	4687															
7000	6482	6482	6482	0.69	0.01	2	0.70		1	0.68		1						
8000	7742	7742	7742	1.20	0.03	2	1.23		1	1.16		1						
			OVERALL MEANS	1.18	0.00	8	1.20	0.18	4	1.16	0.18	4						

ESTIMATED AT 10,000 PPMV 0.86 95 % CONFIDENCE INTERVAL : (0.64, 1.15)

Figure 5-47

INSTRUMENT RESPONSE VS CONCENTRATION

CHLOROPROPENE, 1-

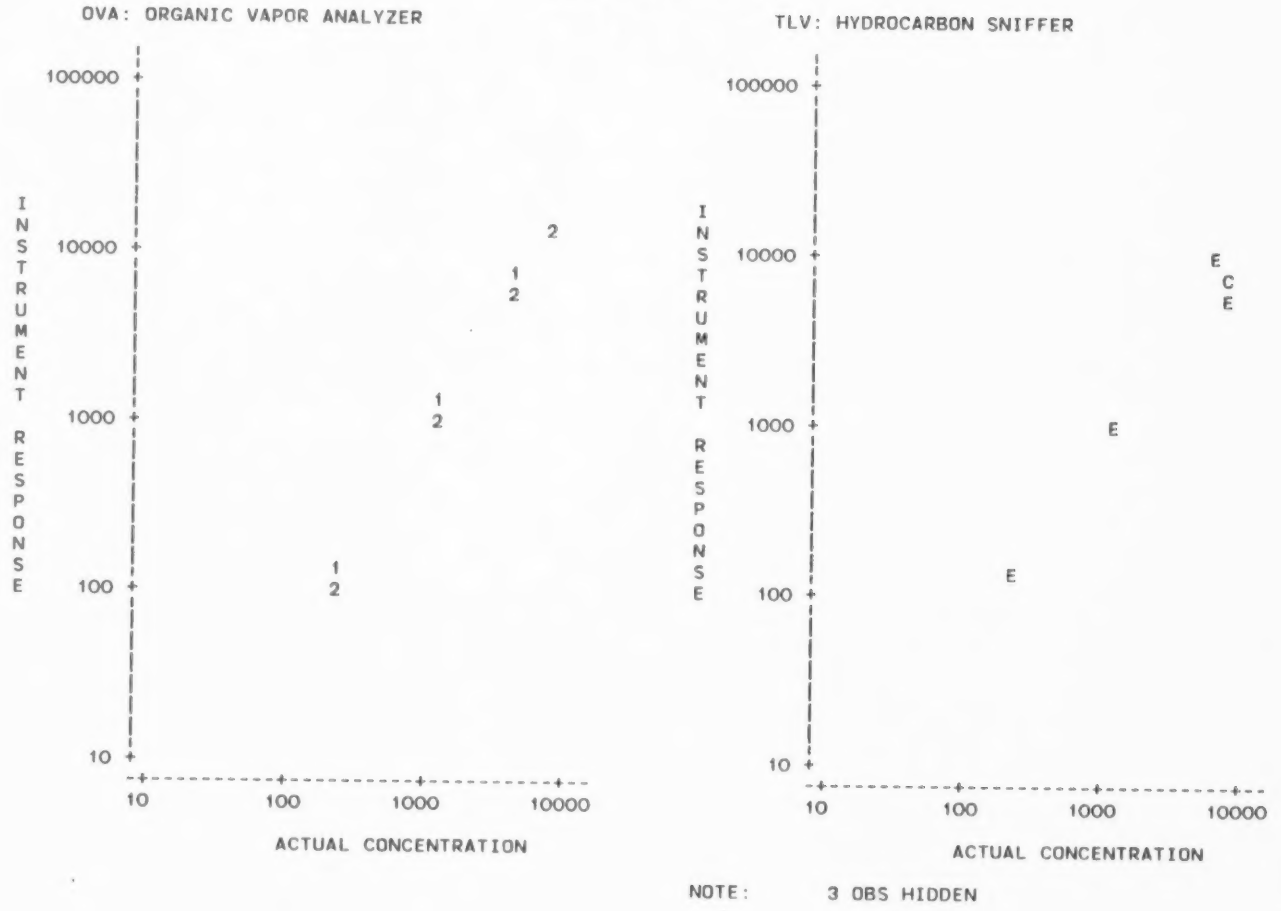


TABLE 5-48

RESPONSE FACTOR SUMMARY

CHLOROPROPENE, 3-

OVA INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL	ACTUAL PPMV			OVERALL			OVA METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	54	54	54	3.11	0.27	4	2.84	0.01	2	3.37	0.02	2						
500	534	546	540	2.02	0.03	4	2.05	0.00	2	1.99	0.02	2						
8000	8793	8879	8836	0.74	0.04	4	0.78	0.07	2	0.70	0.00	2						
			OVERALL MEANS	1.95	0.01	12	1.89	0.38	6	2.02	0.49	6						

ESTIMATED AT 10,000 PPMV 0.75 95 % CONFIDENCE INTERVAL : (0.65, 0.87)

TLV INSTRUMENTS

R E S P O N S E F A C T O R S

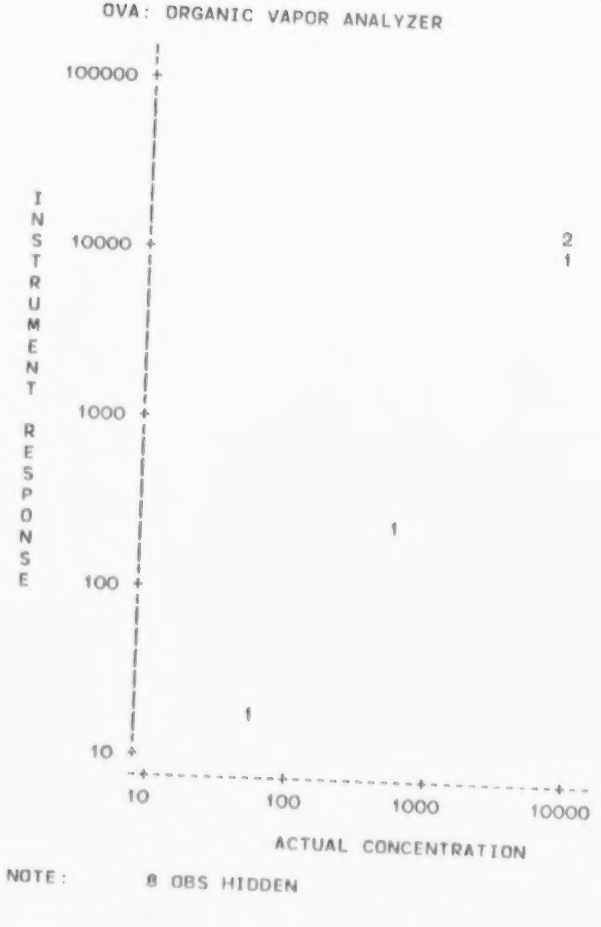
NOMINAL	ACTUAL PPMV			OVERALL			TLV METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
50	54	54	54	1.29	0.16	4	1.45	0.14	2	1.14	0.07	2						
500	534	546	540	1.32	0.13	4	1.45	0.08	2	1.19	0.04	2						
8000	8793	8879	8836	1.23	0.08	4	1.31	0.00	2	1.16	0.00	2						
			OVERALL MEANS	1.28	0.01	12	1.40	0.05	6	1.16	0.02	6						

ESTIMATED AT 10,000 PPMV 1.24 95 % CONFIDENCE INTERVAL : (1.09, 1.41)

Figure 5-48

INSTRUMENT RESPONSE VS CONCENTRATION

CHLOROPROPENE, 3-



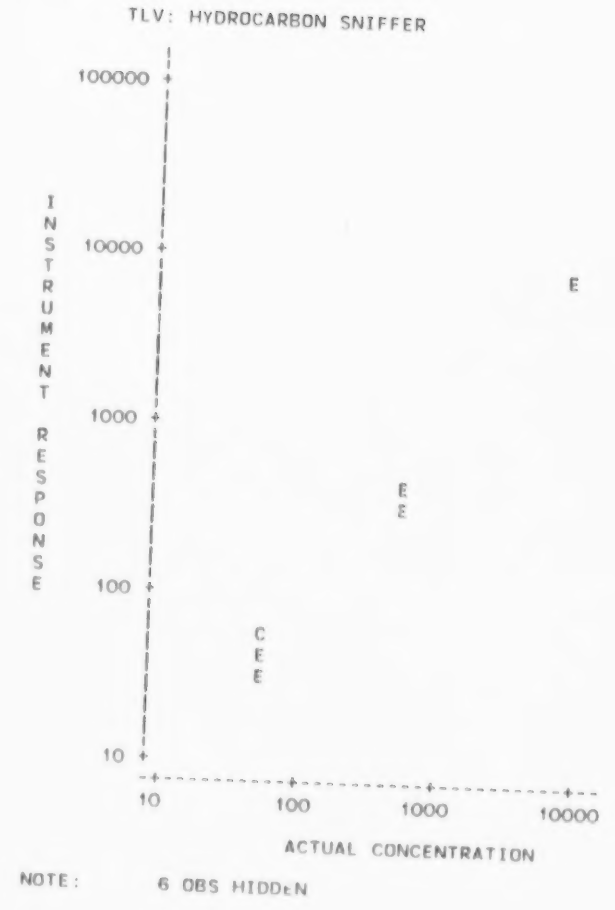


TABLE 5-49

RESPONSE FACTOR SUMMARY

CHLOROTOLUENE,M-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	217	217	217	0.75	0.02	2	0.72		1	0.77		1						
1500	1536	1536	1536	0.55	0.02	2	0.53		1	0.57		1						
3200	3206	3206	3206	0.51	0.00	2	0.51		1	0.52		1						
		OVERALL MEANS		0.60	0.00	6	0.59	0.07	3	0.62	0.08	3						

ESTIMATED AT 10,000 PPMV 0.43

95 % CONFIDENCE INTERVAL : (0.39, 0.47)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	217	217	217	0.65		1										0.65		1
1500	1536	1536	1536	0.73		1										0.73		1
3200	3206	3206	3206	0.86		1										0.86		1
		OVERALL MEANS		0.75		3										0.75	0.06	3

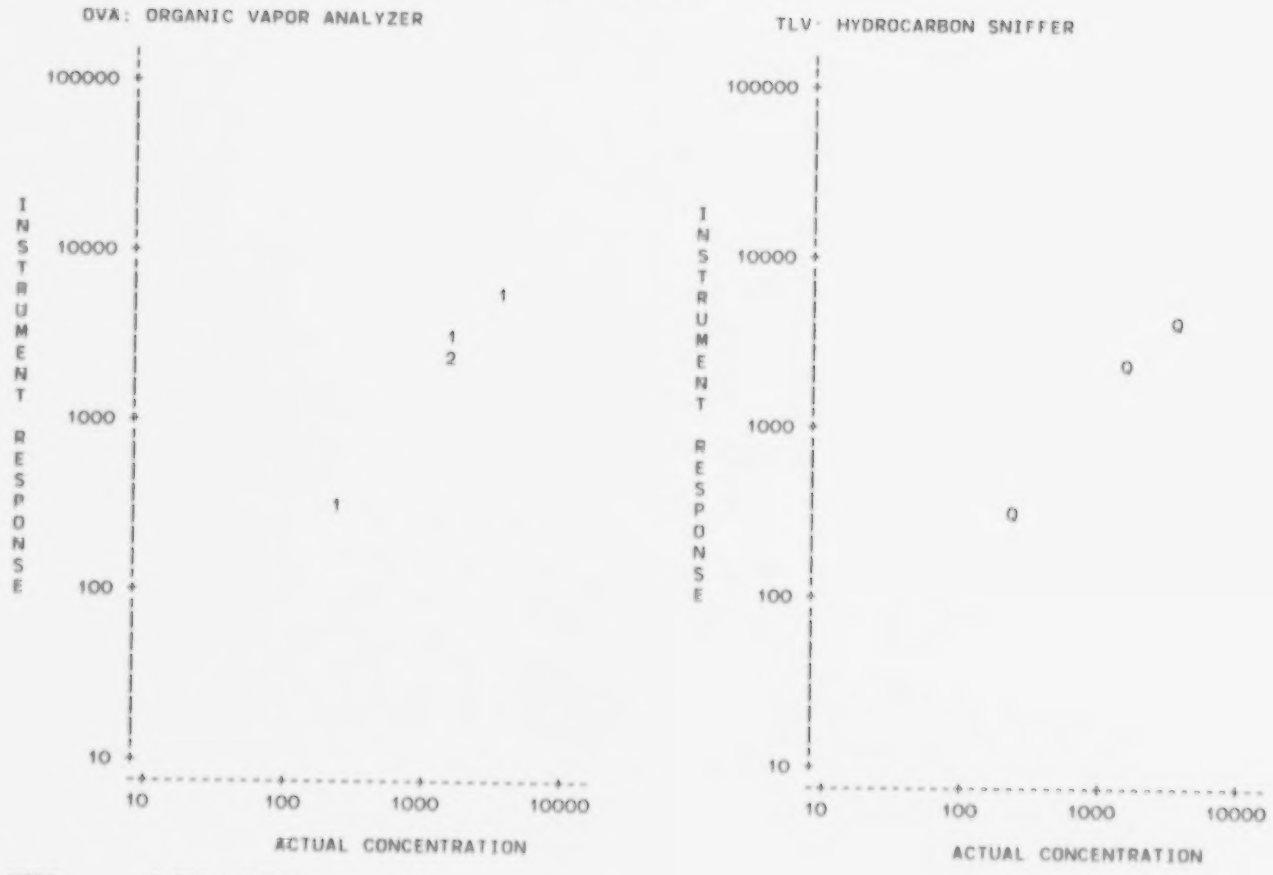
ESTIMATED AT 10,000 PPMV 0.92

95 % CONFIDENCE INTERVAL : (0.70, 1.21)

Figure 5-49

INSTRUMENT RESPONSE VS CONCENTRATION

CHLOROTOLUENE,M-



NOTE: 2 OBS HIDDEN

TABLE 5-50

RESPONSE FACTOR SUMMARY

CHLOROTOLUENE,O-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N
200	207	207	207	0.61	0.05	2
1500	1504	1504	1504	0.53	0.03	2
3100	3028	3028	3028	0.50	0.01	2
OVERALL MEANS				0.55	0.00	6
ESTIMATED AT 10,000 PPMV				0.45		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
0.56		1	0.67		1						
0.50		1	0.56		1						
0.49		1	0.50		1						
0.52	0.02	3	0.58	0.05	3						

95 % CONFIDENCE INTERVAL : (0.38, 0.54)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N
200	207	207	207	0.66		1
1500	1504	1504	1504	0.77		1
3100	3028	3028	3028	0.96		1
OVERALL MEANS				0.80		3
ESTIMATED AT 10,000 PPMV				1.05		

RESPONSE FACTORS

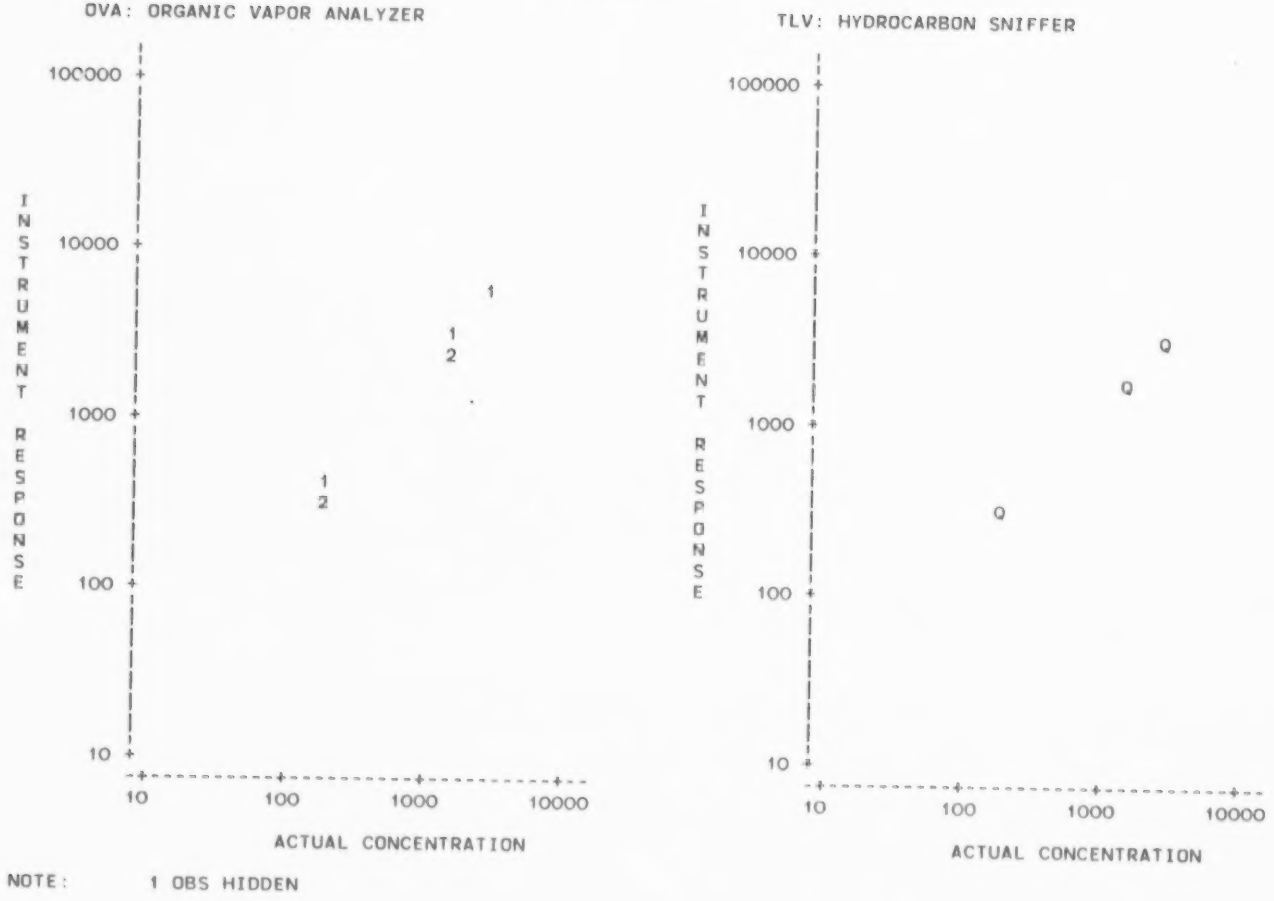
TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
									0.66		1
									0.77		1
									0.96		1
									0.80	0.09	3

95 % CONFIDENCE INTERVAL : (0.70, 1.58)

Figure 5-50

INSTRUMENT RESPONSE VS CONCENTRATION

CHLOROTOLUENE,O-



NOTE: 1 OBS HIDDEN

TABLE 5-51

RESPONSE FACTOR SUMMARY

CHLOROTOLUENE,P-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	217	217	217	0.85	0.02	2
1500	1590	1590	1590	0.63	0.01	2
3100	3126	3126	3126	0.63	0.01	2
		OVERALL MEANS		0.70	0.00	6
	ESTIMATED AT 10,000 PPMV			0.52		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
0.87		1	0.83		1						
0.64		1	0.61		1						
0.63		1	0.62		1						
0.71	0.08	3	0.69	0.07	3						

95 % CONFIDENCE INTERVAL : (0.47, 0.58)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	217	217	217	0.86		1
1500	1590	1590	1590	0.88		1
3100	3126	3126	3126	1.15		1
		OVERALL MEANS		0.96		3
	ESTIMATED AT 10,000 PPMV			1.15		

RESPONSE FACTORS

TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
									0.86		1
									0.88		1
									1.15		1
									0.96	0.09	3

95 % CONFIDENCE INTERVAL : (0.62, 2.12)

Figure 5-51

INSTRUMENT RESPONSE VS CONCENTRATION

CHLOROTOLUENE,P-

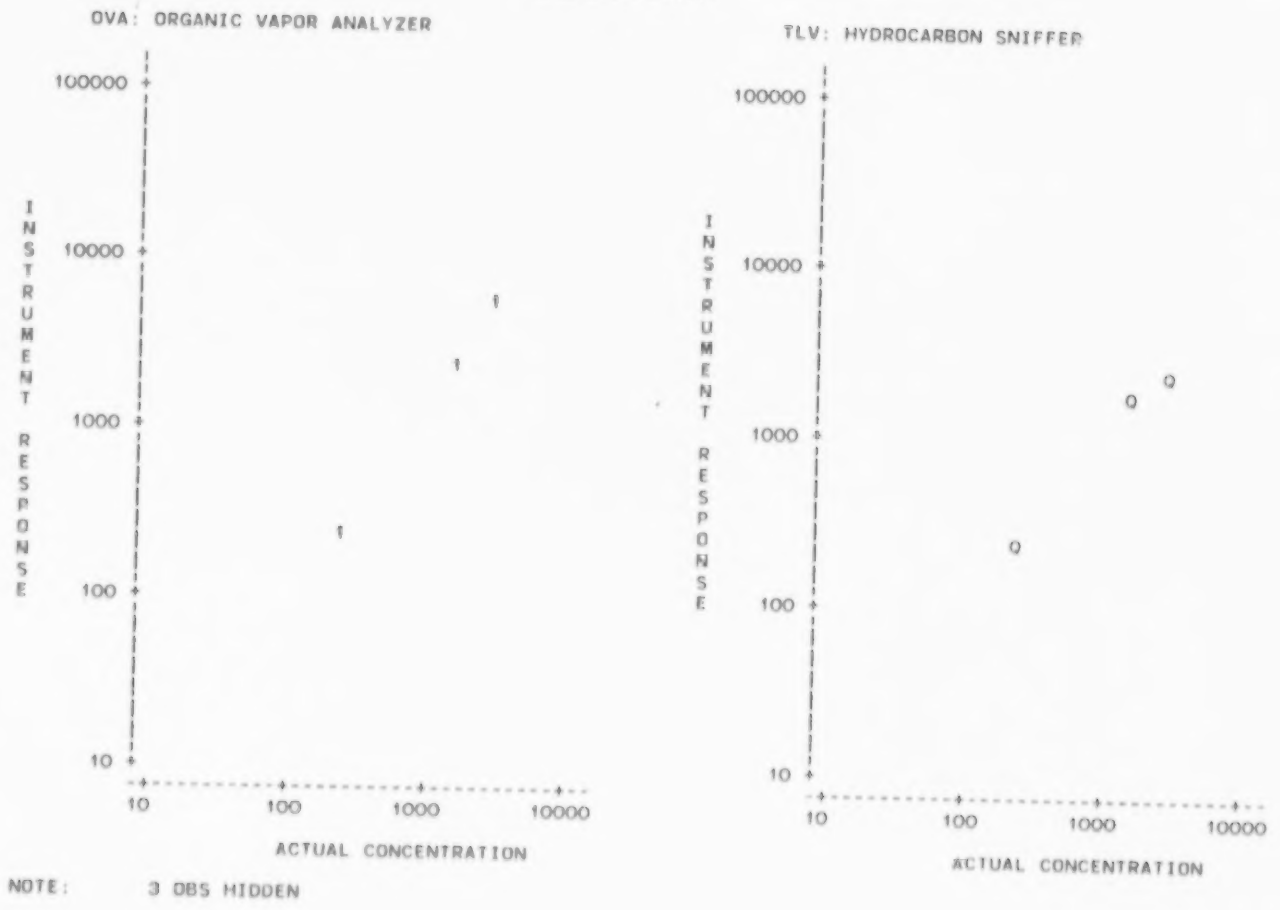


TABLE 5-52

RESPONSE FACTOR SUMMARY

CRESOL,O-

OVA INSTRUMENTS — R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	210	210	210	5.88	0.49	2	5.39		1	6.36		1						
650	705	705	705	3.75	0.11	2	3.64		1	3.85		1						
1100	1117	1117	1117	2.52	0.00	2	2.51		1	2.52		1						
		OVERALL MEANS		4.05	0.03	6	3.85	0.84	3	4.25	1.13	3						

ESTIMATED AT 10,000 PPMV 0.95 — 95 % CONFIDENCE INTERVAL : (0.59, 1.52)

TLV INSTRUMENTS — R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	210	210	210	0.83		1										0.83		1
650	705	705	705	1.98		1										1.98		1
1100	1117	1117	1117	1.43		1										1.43		1
		OVERALL MEANS		1.41		3										1.41	0.33	3

ESTIMATED AT 10,000 PPMV 3.98 — 95 % CONFIDENCE INTERVAL : (0.22,72.91)

Figure 5-52

INSTRUMENT RESPONSE VS CONCENTRATION

CRESOL,O-

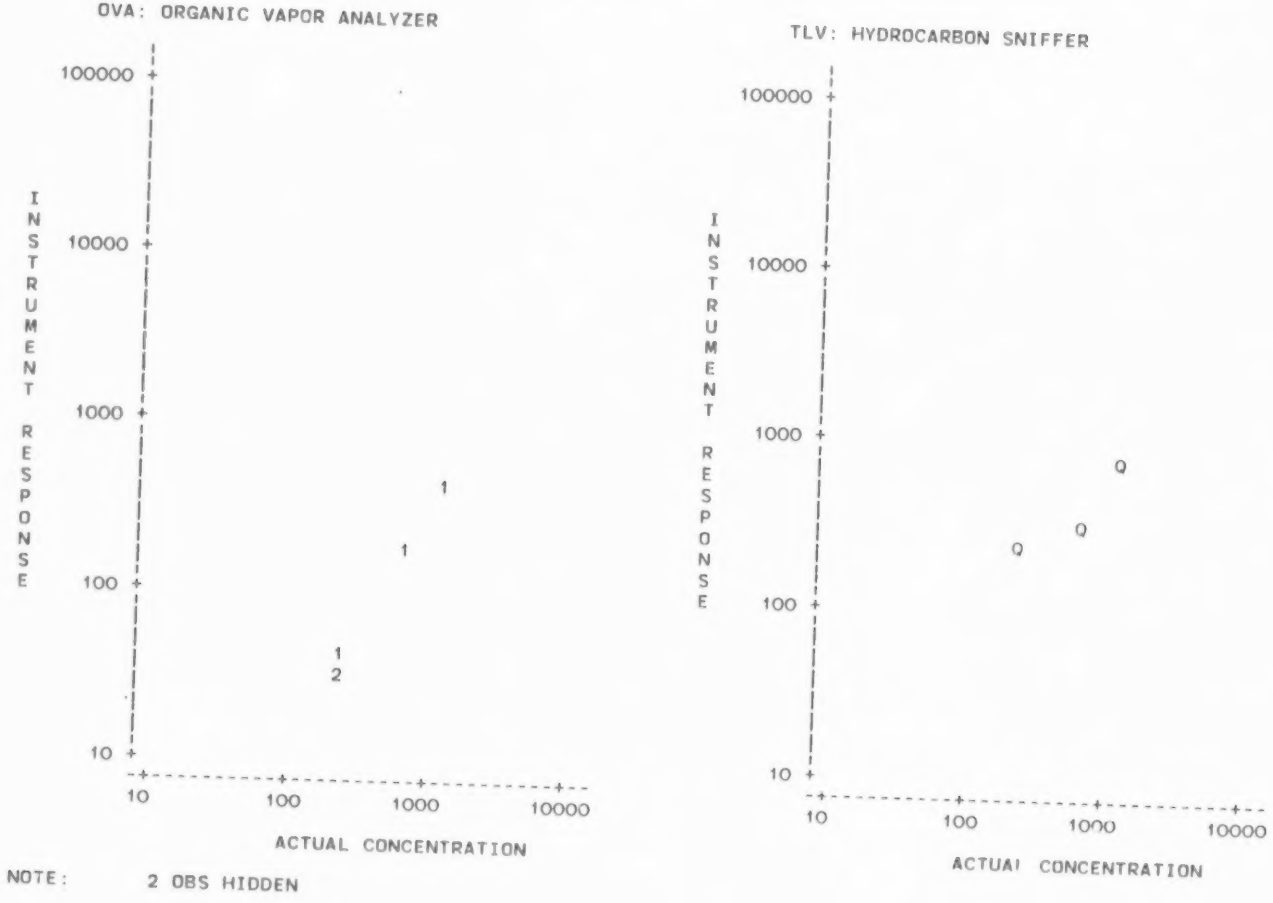


TABLE 5-53

RESPONSE FACTOR SUMMARY

CROTONALDEHYDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	245	245	245	2.61	0.18	2	2.43		1	2.79		1						
1000	1063	1063	1063	2.79	0.10	2	2.90		1	2.69		1						
1500	1698	1698	1698	3.29	0.07	2	3.23		1	3.36		1						
8000	8723	8723	8723	1.08	0.01	2	1.08		1	1.09		1						
		OVERALL MEANS		2.45	0.00	8	2.41	0.47	4	2.48	0.49	4						

ESTIMATED AT 10,000 PPMV 1.32 95 % CONFIDENCE INTERVAL : (0.78, 2.23)

TLV INSTRUMENTS

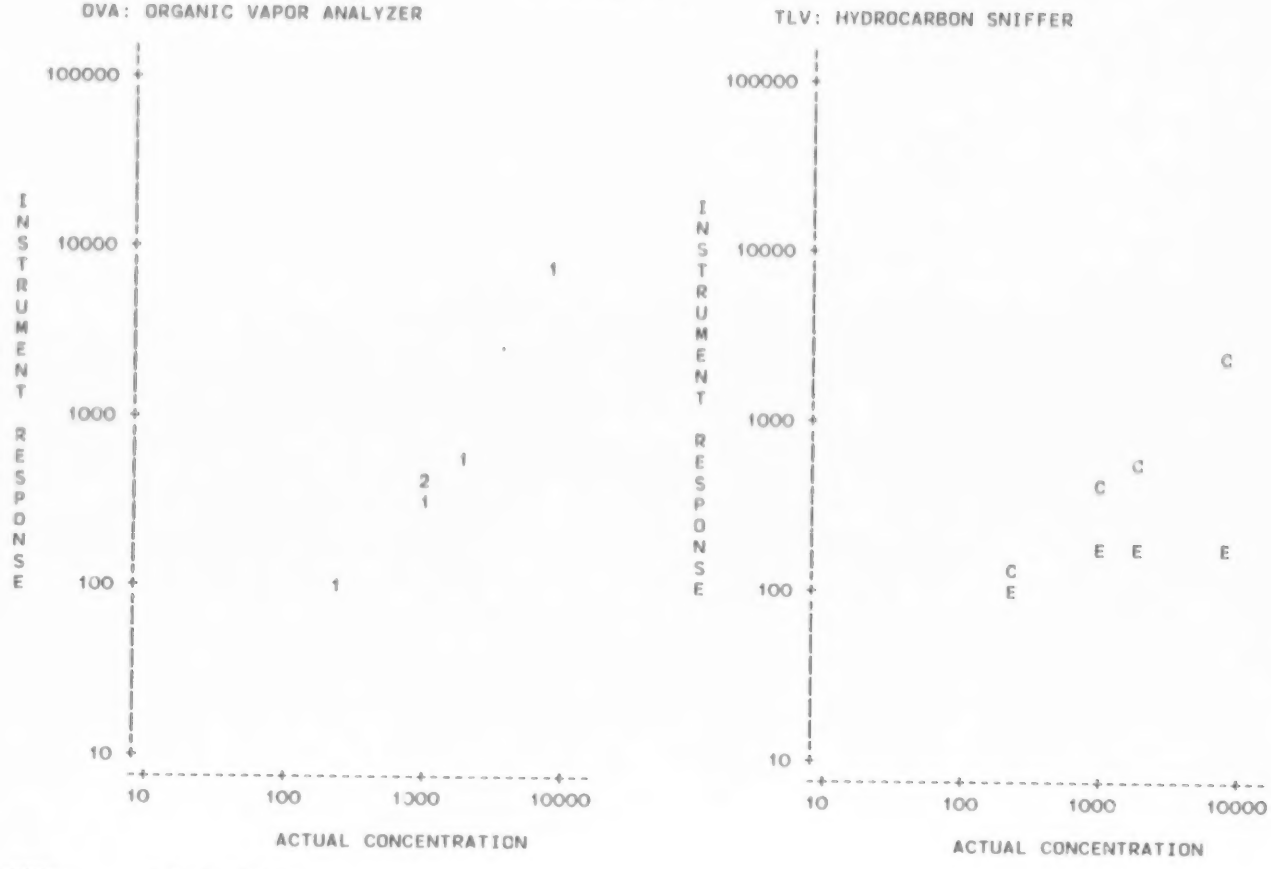
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	245	245	245	2.01	0.23	2	2.24		1	1.79		1						
1000	1063	1063	1063	3.89	1.66	2	5.55		1	2.23		1						
1500	1698	1698	1698	6.56	3.38	2	9.94		1	3.18		1						
8000	8723	8723	8723	22.86	19.7	2	42.54		1	3.19		1						
		OVERALL MEANS		8.83	0.78	8	15.07	9.29	4	2.60	0.35	4						

ESTIMATED AT 10,000 PPMV 8.54 95 % CONFIDENCE INTERVAL : (2.33,31.36)

Figure 5-53

INSTRUMENT RESPONSE VS CONCENTRATION

CROTONALDEHYDE



NOTE: 3 OBS HIDDEN

TABLE 5-54

RESPONSE FACTOR SUMMARY

CUMENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
50	54	57	56	3.17	0.66	4
500	545	548	547	2.73	0.07	4
8000	8625	8745	8685	2.45	0.03	4
			OVERALL MEANS	2.78	0.02	12

ESTIMATED AT 10,000 PPMV 1.92

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
2.51	1.37	2	3.83	1.11	2						
2.66	0.91	2	2.80	0.63	2						
2.48	1.38	2	2.42	0.74	2						
2.55	0.55	6	3.01	0.46	6						

95 % CONFIDENCE INTERVAL : (1.13, 3.28)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
50	54	57	56	2.34	0.48	4
500	545	548	547	10.07	5.02	4
8000	8625	8745	8685	20.04	14.5	4
			OVERALL MEANS	10.82	0.56	12

ESTIMATED AT 10,000 PPMV 12.49

RESPONSE FACTORS

TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
2.82	0.17	2	1.86	0.18	2						
15.09	0.24	2	5.05	0.34	2						
34.59	3.04	2	5.49	1.39	2						
17.50	5.90	6	4.13	0.81	6						

95 % CONFIDENCE INTERVAL : (5.62,27.74)

Figure 5-54

INSTRUMENT RESPONSE VS CONCENTRATION

CUMENE

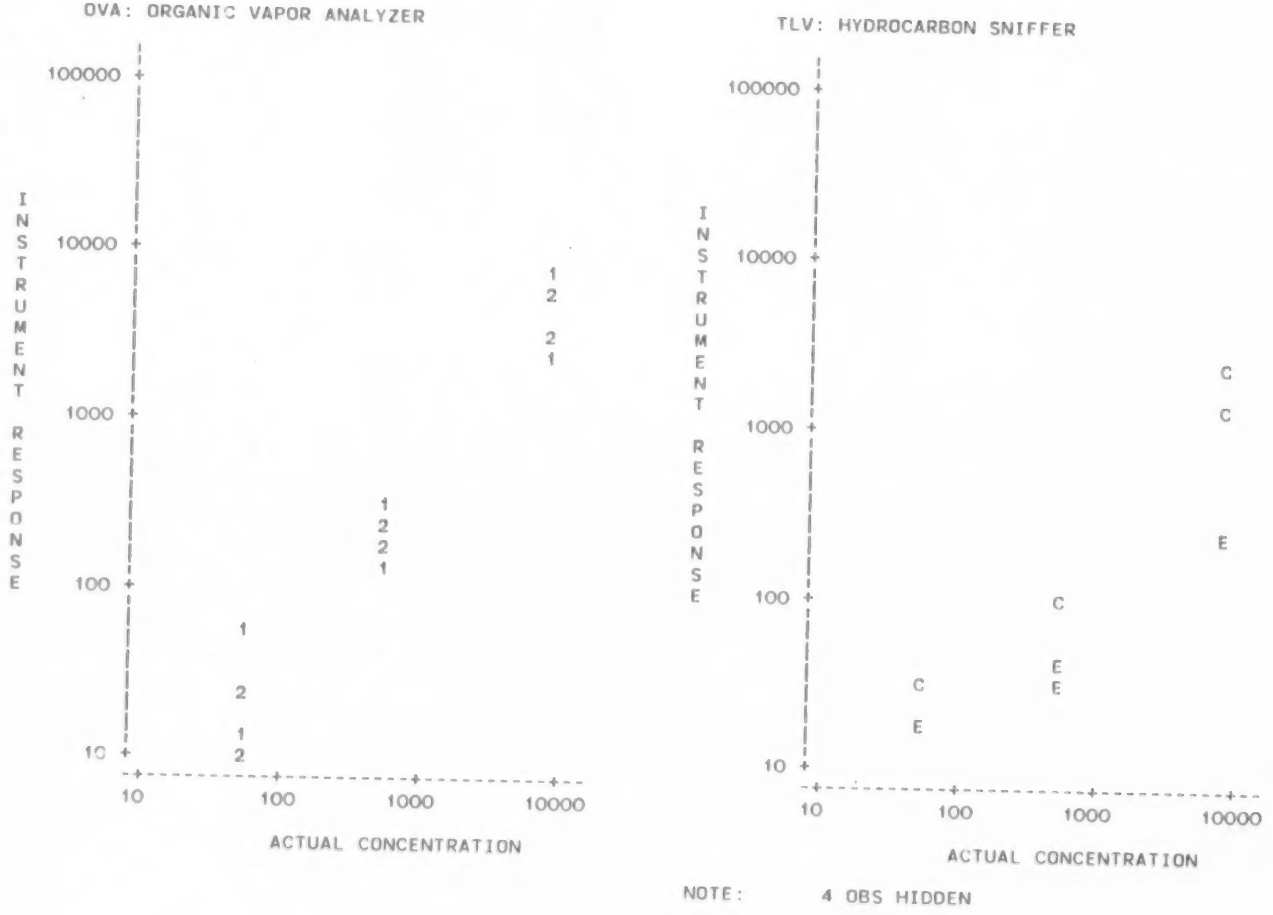


TABLE 5-55

RESPONSE FACTOR SUMMARY

CYCLOHEXANE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	220	220	220	1.27	0.00	2	1.27		1	1.27		1						
1500	1691	1691	1691	0.77	0.04	2	0.74		1	0.81		1						
3000	3163	3163	3163	0.48	0.03	2	0.45		1	0.51		1						
5000	5114	5114	5114															
8000	7999	7999	7999															
OVERALL MEANS				0.84	0.00	6	0.82	0.24	3	0.86	0.22	3						

ESTIMATED AT 10,000 PPMV 0.36 95 % CONFIDENCE INTERVAL : (0.26, 0.50)

TLV INSTRUMENTS

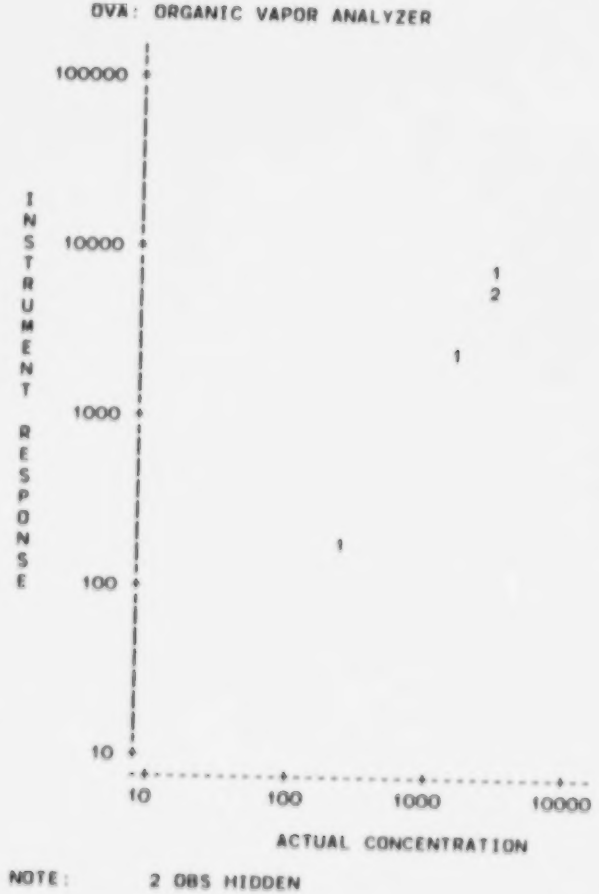
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	220	220	220	0.56	0.04	2	0.61		1	0.52		1						
1500	1691	1691	1691	0.58	0.09	2	0.67		1	0.48		1						
3000	3163	3163	3163	0.70	0.03	2	0.72		1	0.67		1						
5000	5114	5114	5114	0.65	0.01	2	0.67		1	0.64		1						
8000	7999	7999	7999	0.76	0.02	2	0.78		1	0.74		1						
OVERALL MEANS				0.65	0.00	10	0.69	0.03	5	0.61	0.05	5						

ESTIMATED AT 10,000 PPMV 0.72 95 % CONFIDENCE INTERVAL : (0.63, 0.82)

Figure 5-55

INSTRUMENT RESPONSE VS CONCENTRATION

CYCLOHEXANE



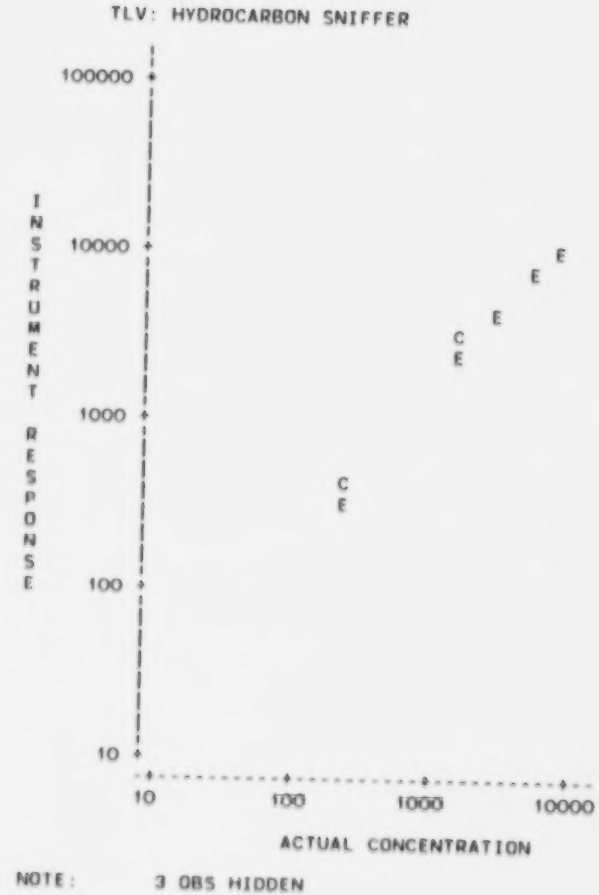


TABLE 5-56

RESPONSE FACTOR SUMMARY

CYCLOHEXANOL

OVA INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	190	190	190	2.10	0.12	2	1.98		1	2.21		1						
700	676	676	676	1.69	0.02	2	1.67		1	1.71		1						
1200	1208	1208	1208	1.31	0.10	2	1.21		1	1.41		1						
		OVERALL MEANS		1.70	0.01	6	1.62	0.22	3	1.78	0.23	3						

ESTIMATED AT 10,000 PPMV 0.82 95 % CONFIDENCE INTERVAL : (0.58, 1.17)

TLV INSTRUMENTS

R E S P O N S E F A C T O R S

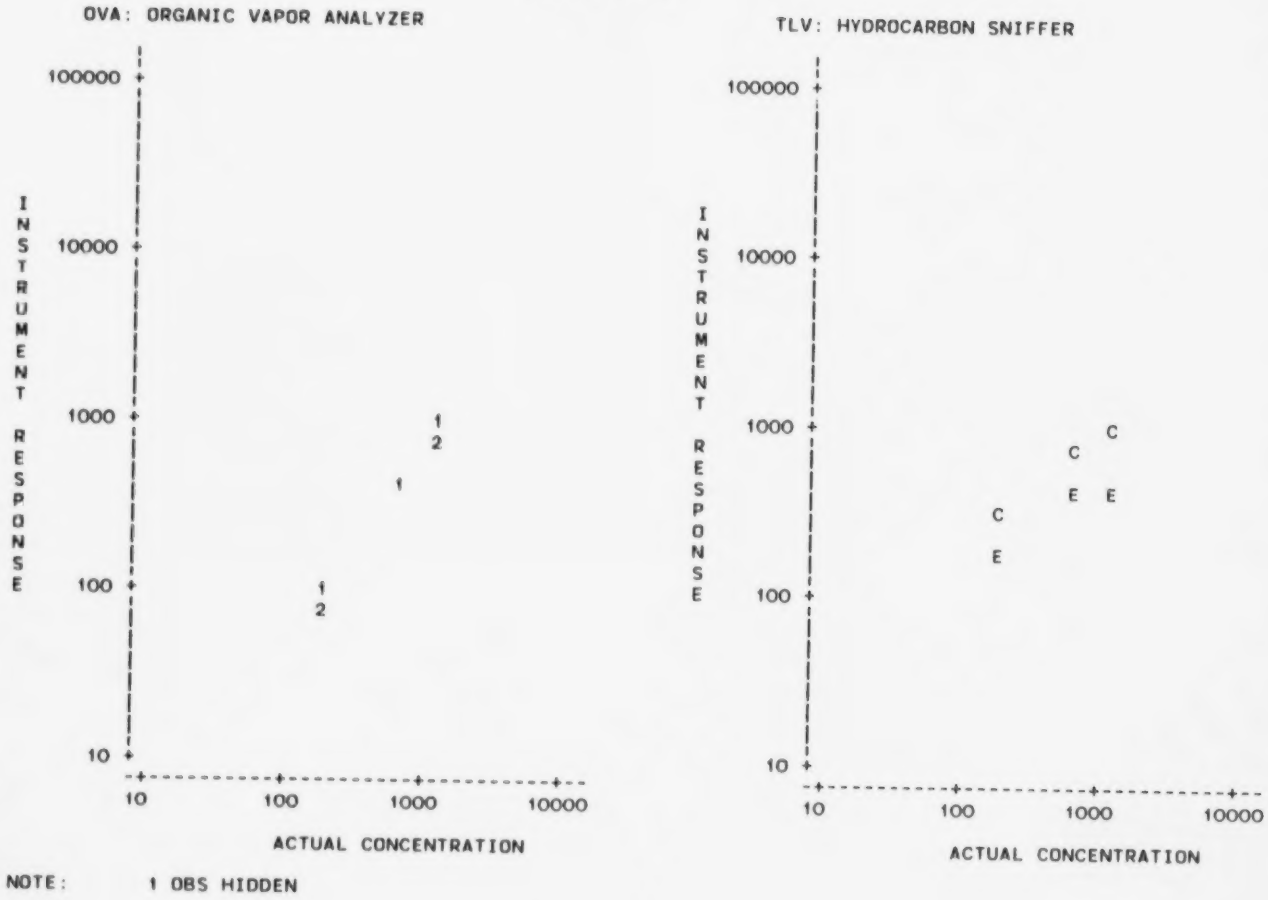
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	190	190	190	0.76	0.20	2	0.96		1	0.55		1						
700	676	676	676	1.25	0.29	2	1.55		1	0.96		1						
1200	1208	1208	1208	2.04	0.68	2	2.72		1	1.37		1						
		OVERALL MEANS		1.35	0.07	6	1.74	0.52	3	0.96	0.23	3						

ESTIMATED AT 10,000 PPMV 4.92 95 % CONFIDENCE INTERVAL : (1.18,20.48)

Figure 5-56

INSTRUMENT RESPONSE VS CONCENTRATION

CYCLOHEXANOL



NOTE: 1 OBS HIDDEN

TABLE 5-57

RESPONSE FACTOR SUMMARY

CYCLOHEXANONE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	189	189	189	1.47	0.25	2	1.22		1	1.72		1						
2000	2078	2078	2078	1.82	0.08	2	1.74		1	1.90		1						
4000	4039	4039	4039	1.33	0.02	2	1.31		1	1.35		1						
			OVERALL MEANS	1.54	0.02	6	1.42	0.16	3	1.65	0.16	3						

ESTIMATED AT 10,000 PPMV 1.50 95 % CONFIDENCE INTERVAL : (1.01, 2.22)

TLV INSTRUMENTS

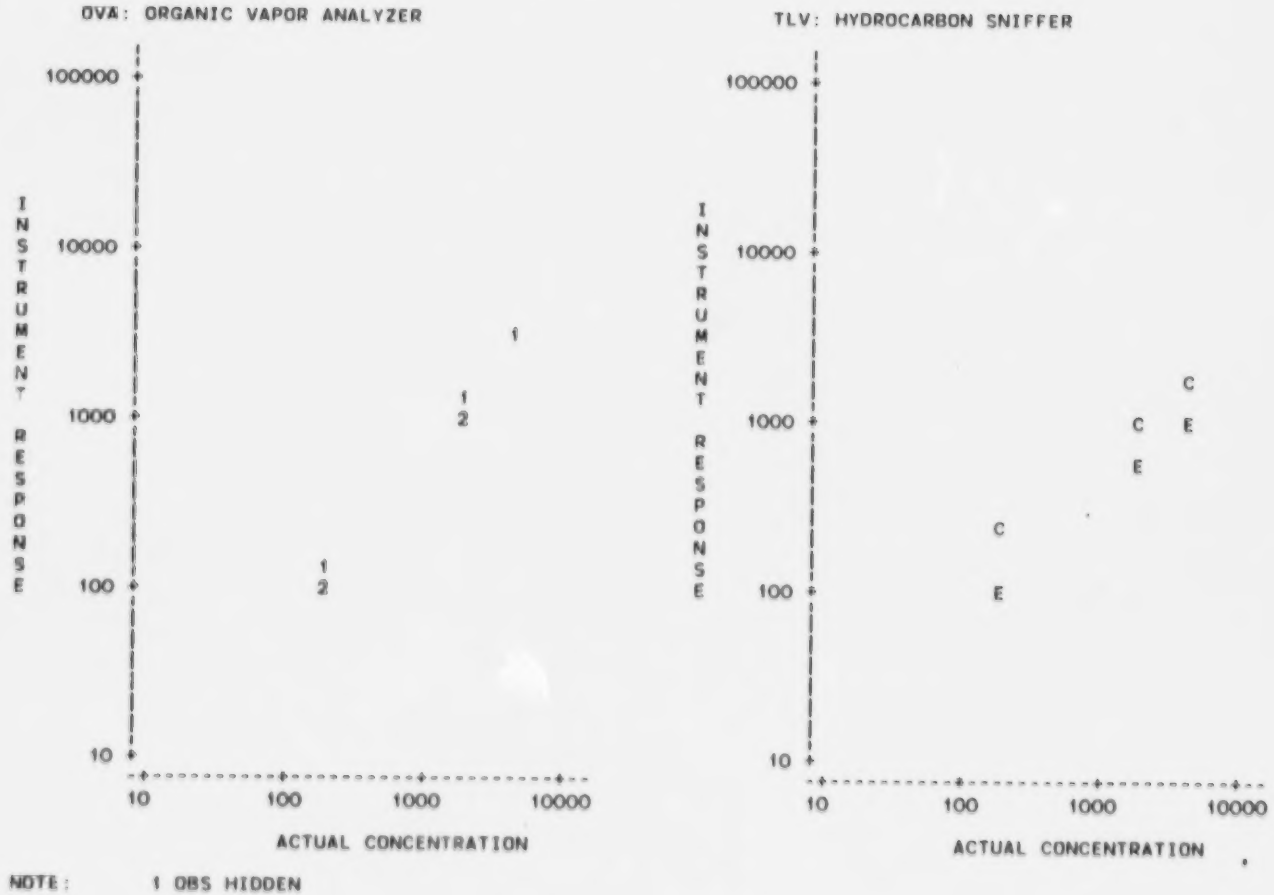
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	189	189	189	1.50	0.60	2	2.09		1	0.90		1						
2000	2078	2078	2078	2.91	0.75	2	3.66		1	2.16		1						
4000	4039	4039	4039	3.47	1.07	2	4.55		1	2.40		1						
			OVERALL MEANS	2.63	0.13	6	3.43	0.72	3	1.82	0.47	3						

ESTIMATED AT 10,000 PPMV 3.99 95 % CONFIDENCE INTERVAL : (1.79, 8.91)

Figure 5-57

INSTRUMENT RESPONSE VS CONCENTRATION

CYCLOHEXANONE



NOTE: 1 OBS HIDDEN

TABLE 5-58

RESPONSE FACTOR SUMMARY

CYCLOHEXENE

OVA INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	204	204	204	1.07	0.09	2	1.16		1	0.97		1						
1500	1569	1569	1569	0.75	0.04	2	0.79		1	0.72		1						
3000	3320	3320	3320	0.52	0.03	2	0.49		1	0.54		1						
4000	4236	4236	4236	0.46		1				0.46		1						
6000	6508	6508	6508															
8000	8074	8074	8074															
		OVERALL MEANS		0.73	0.01	7	0.81	0.19	3	0.67	0.11	4						

ESTIMATED AT 10,000 PPMV 0.40 95 % CONFIDENCE INTERVAL : (0.32, 0.51)

TLV INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	204	204	204	0.84		1										0.84		1
1500	1569	1569	1569	1.13		1										1.13		1
3000	3320	3320	3320	1.44		1										1.44		1
4000	4236	4236	4236	1.44		1										1.44		1
6000	6508	6508	6508	1.77		1										1.77		1
8000	8074	8074	8074	1.88		1										1.88		1
		OVERALL MEANS		1.42		6										1.42	0.16	6

ESTIMATED AT 10,000 PPMV 1.84 95 % CONFIDENCE INTERVAL : (1.65, 2.05)

Figure 5-58

INSTRUMENT RESPONSE VS CONCENTRATION

CYCLOHEXENE

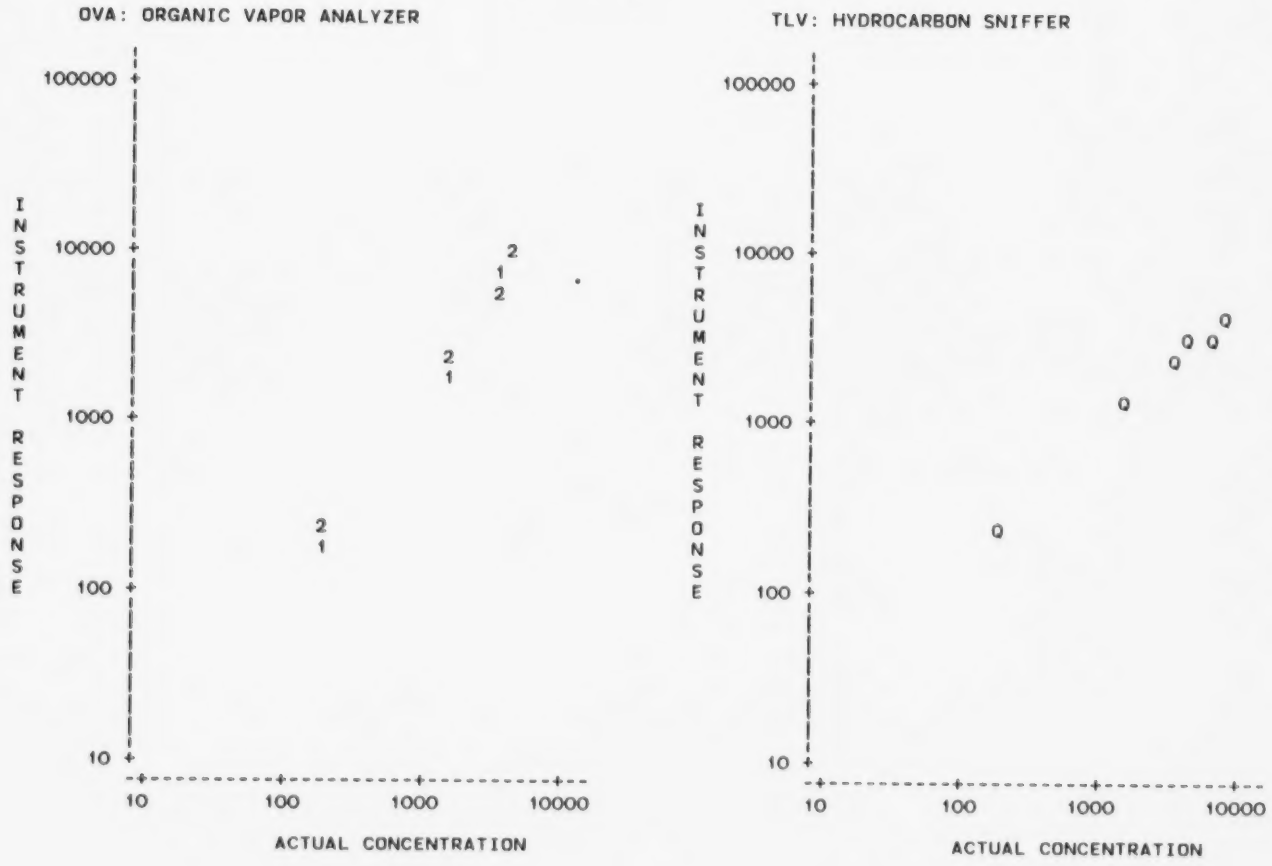


TABLE 5-59

RESPONSE FACTOR SUMMARY

CYCLOHEXYLAMINE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	213	213	213	1.73	0.26	2	1.99		1	1.47		1						
1500	1735	1735	1735	1.15	0.19	2	1.34		1	0.97		1						
4000	4498	4498	4498	0.54	0.01	2	0.53		1	0.56		1						
6000	6641	6641	6641															
8000	8478	8478	8478															
		OVERALL MEANS		1.14	0.02	6	1.28	0.42	3	1.00	0.26	3						

ESTIMATED AT 10,000 PPMV 0.47 95 % CONFIDENCE INTERVAL : (0.28, 0.79)

TLV INSTRUMENTS

RESPONSE FACTORS

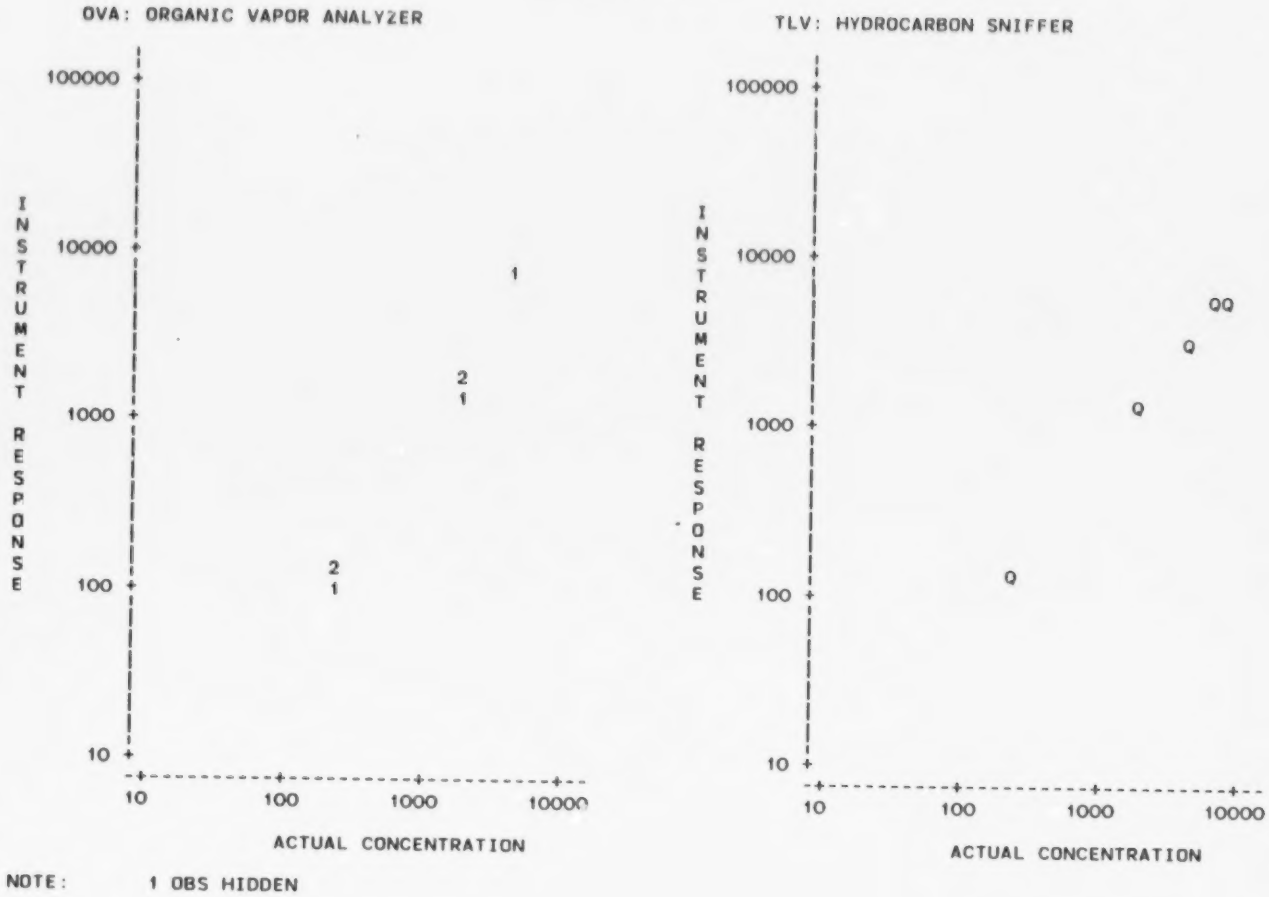
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	213	213	213	1.44		1										1.44		1
1500	1735	1735	1735	1.38		1										1.38		1
4000	4498	4498	4498	1.38		1										1.38		1
6000	6641	6641	6641	1.35		1										1.35		1
8000	8478	8478	8478	1.44		1										1.44		1
		OVERALL MEANS		1.40		5										1.40	0.02	5

ESTIMATED AT 10,000 PPMV 1.38 95 % CONFIDENCE INTERVAL : (1.31, 1.45)

Figure 5-59

INSTRUMENT RESPONSE VS CONCENTRATION

CYCLOHEXYLAMINE



NOTE: 1 OBS HIDDEN

TABLE 5-60

RESPONSE FACTOR SUMMARY

DECANE

OVA INSTRUMENTS — R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	188	188	188	10.77	1.80	2	8.98		1	12.57		1						
300	300	300	300	0.83	0.15	2	0.67		1	0.98		1						
400	435	435	435	1.61	0.51	2	1.10		1	2.12		1						
		OVERALL MEANS		4.40	0.14	6	3.58	2.70	3	5.22	3.69	3						

ESTIMATED AT 10,000 PPMV 0.00 — 95 % CONFIDENCE INTERVAL : (0.00, 3.31)

TLV INSTRUMENTS — R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	188	188	188	2.55	0.38	2	2.93		1	2.17		1						
300	300	300	300	1.02	0.24	2	1.25		1	0.78		1						
400	435	435	435	1.72	0.40	2	2.12		1	1.32		1						
		OVERALL MEANS		1.76	0.06	6	2.10	0.48	3	1.42	0.40	3						

ESTIMATED AT 10,000 PPMV 0.20 — 95 % CONFIDENCE INTERVAL : (0.00,31.01)

Figure 5-60

INSTRUMENT RESPONSE VS CONCENTRATION

DECANE

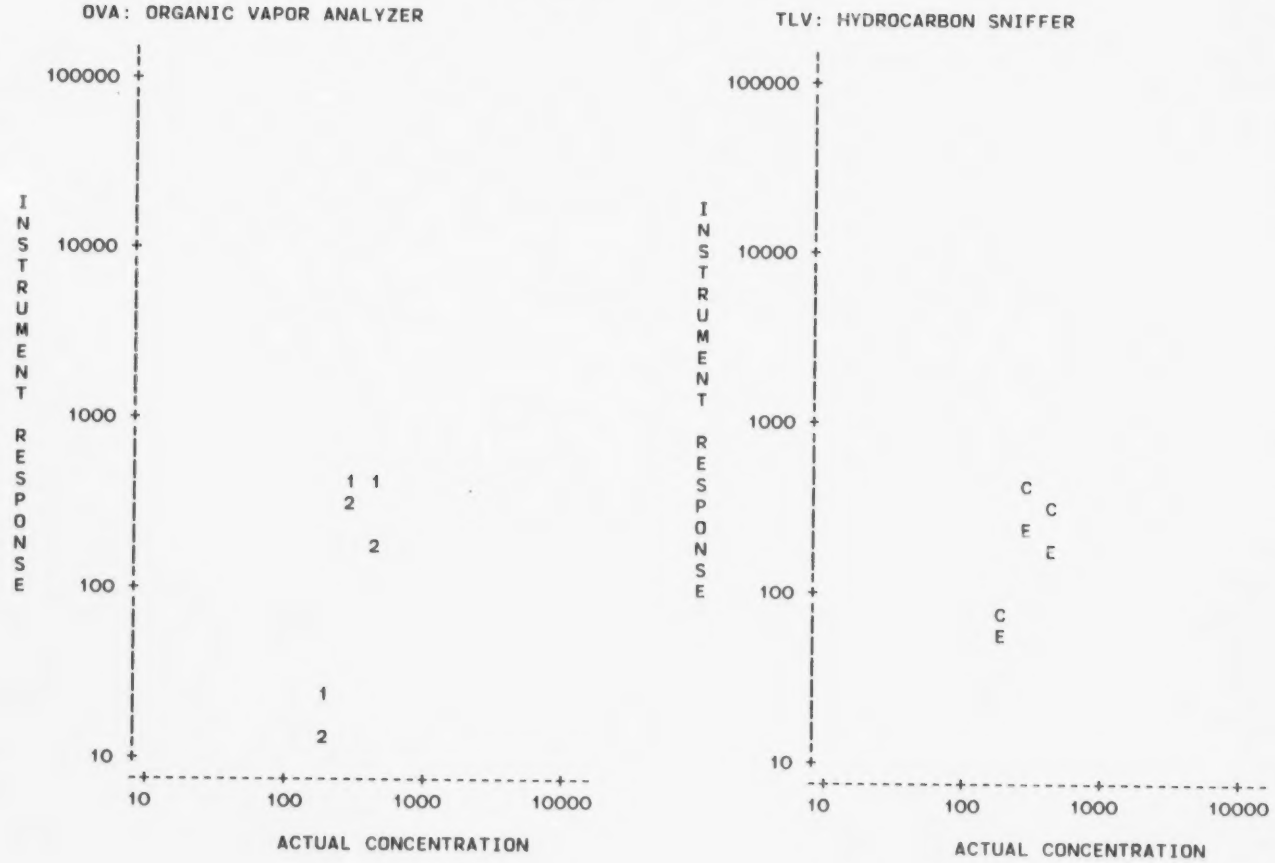


TABLE 5-61

RESPONSE FACTOR SUMMARY

DIACETONE ALCOHOL

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	227	227	227	2.60	0.19	2	2.41		1	2.80		1						
1500	793	793	793	2.44	0.16	2	2.28		1	2.60		1						
8000	1387	1387	1387	1.93	0.07	2	1.86		1	2.00		1						
		OVERALL MEANS		2.32	0.02	6	2.18	0.17	3	2.46	0.24	3						

ESTIMATED AT 10,000 PPMV 1.53 95 % CONFIDENCE INTERVAL : (1.01, 2.31)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	227	227	227	2.64	0.62	2	3.25		1	2.02		1						
1500	793	793	793	2.26	0.71	2	2.97		1	1.55		1						
8000	1387	1387	1387	1.60	0.28	2	1.88		1	1.32		1						
		OVERALL MEANS		2.16	0.09	6	2.70	0.42	3	1.63	0.21	3						

ESTIMATED AT 10,000 PPMV 0.98 95 % CONFIDENCE INTERVAL : (0.29, 3.36)

Figure 5-61

INSTRUMENT RESPONSE VS CONCENTRATION

DIACETONE ALCOHOL

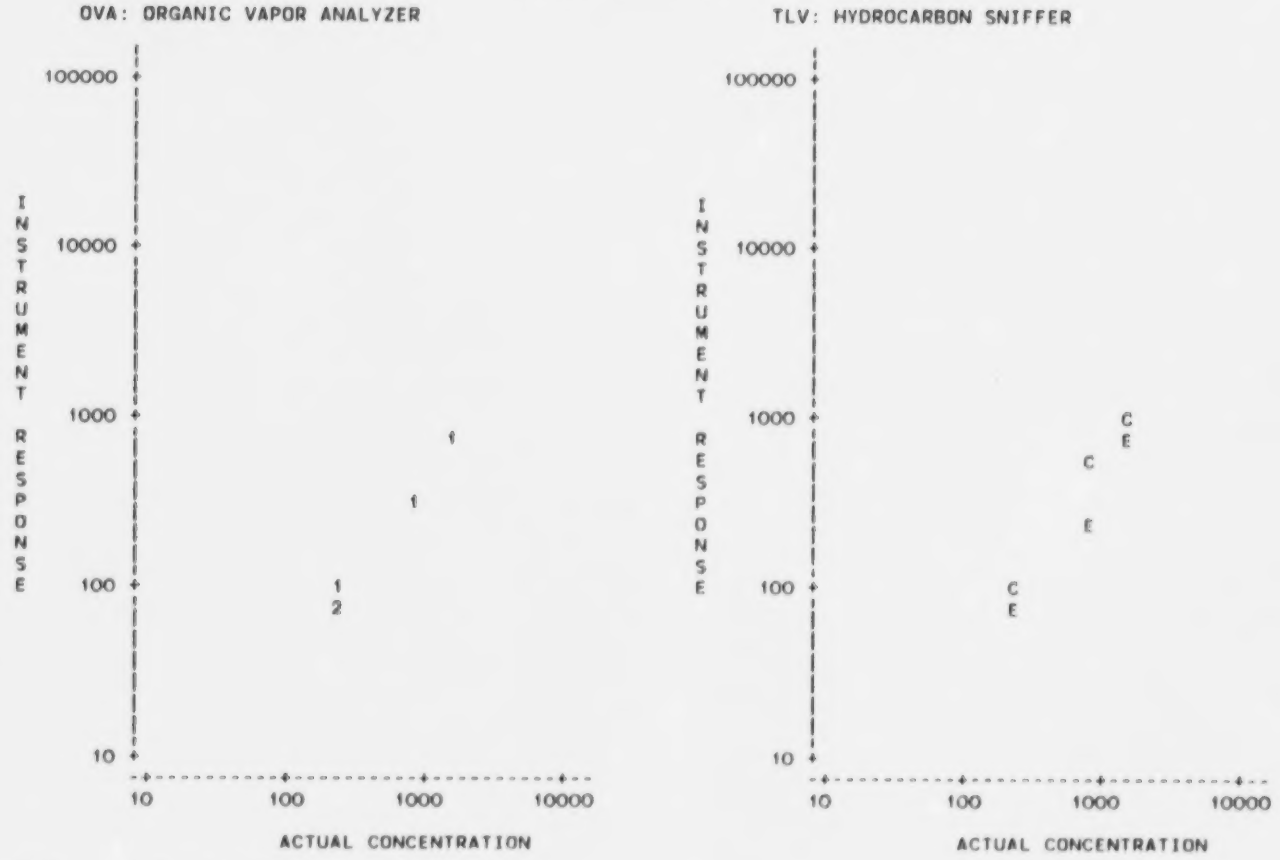


TABLE 5-62

RESPONSE FACTOR SUMMARY

DIACETYL

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	68	70	69	3.19	0.17	4	3.02	0.32	2	3.36	0.15	2						
500	598	598	598	2.03	0.05	4	2.08	0.48	2	1.98	0.13	2						
8000	9560	9730	9645	1.79	0.22	4	2.01	0.29	2	1.57	0.24	2						
		OVERALL MEANS		2.34	0.00	12	2.37	0.27	6	2.30	0.35	6						

ESTIMATED AT 10,000 PPMV 1.61 95 % CONFIDENCE INTERVAL : (1.31, 1.99)

TLV INSTRUMENTS

RESPONSE FACTORS

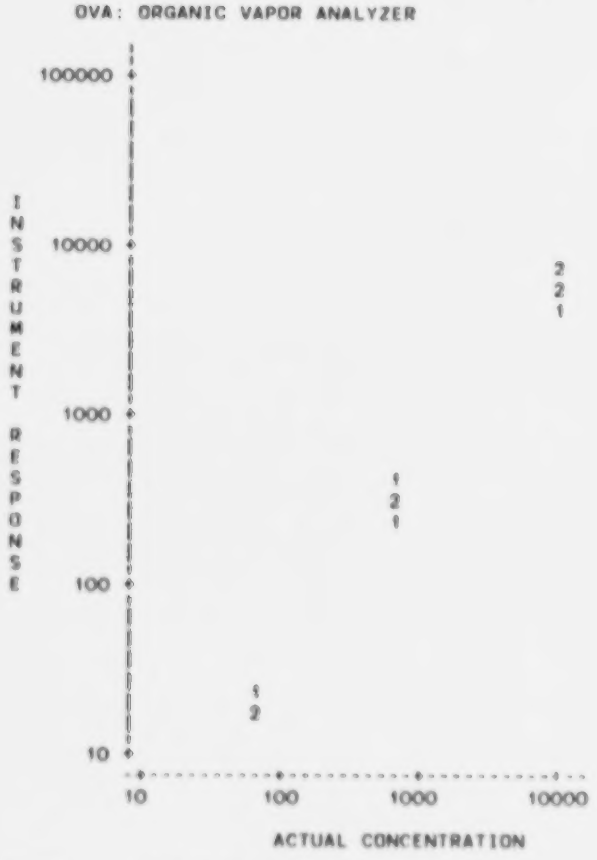
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
50	68	70	69	1.46	0.18	4	1.64	0.27	2	1.28	0.19	2						
500	598	598	598	2.28	0.43	4	2.71	0.21	2	1.85	0.04	2						
8000	9560	9730	9645	2.87	0.67	4	3.54	0.57	2	2.19	0.24	2						
		OVERALL MEANS		2.20	0.04	12	2.63	0.39	6	1.78	0.19	6						

ESTIMATED AT 10,000 PPMV 2.81 95 % CONFIDENCE INTERVAL : (2.15, 3.67)

Figure 5-62

INSTRUMENT RESPONSE VS CONCENTRATION

DIACETYL



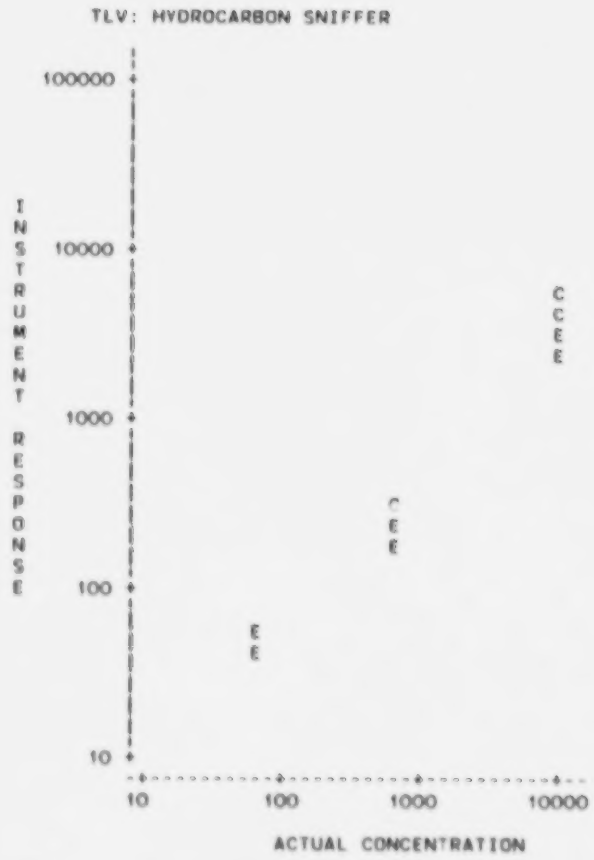


TABLE 5-63

RESPONSE FACTOR SUMMARY

DICHLORO-1-PROPANOL,2,3-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	212	212	212	53.10	17.7	2	35.40		1	70.80		1						
1500	1489	1489	1489	36.20	5.17	2	31.03		1	41.37		1						
8000	8470	8470	8470	81.48	1.57	2	83.04		1	79.91		1						
	OVERALL MEANS			56.92	1.18	6	49.82	16.7	3	64.03	11.6	3						

ESTIMATED AT 10,000 PPMV 61.51 95 % CONFIDENCE INTERVAL : (30.13,125.5)

TLV INSTRUMENTS

RESPONSE FACTORS

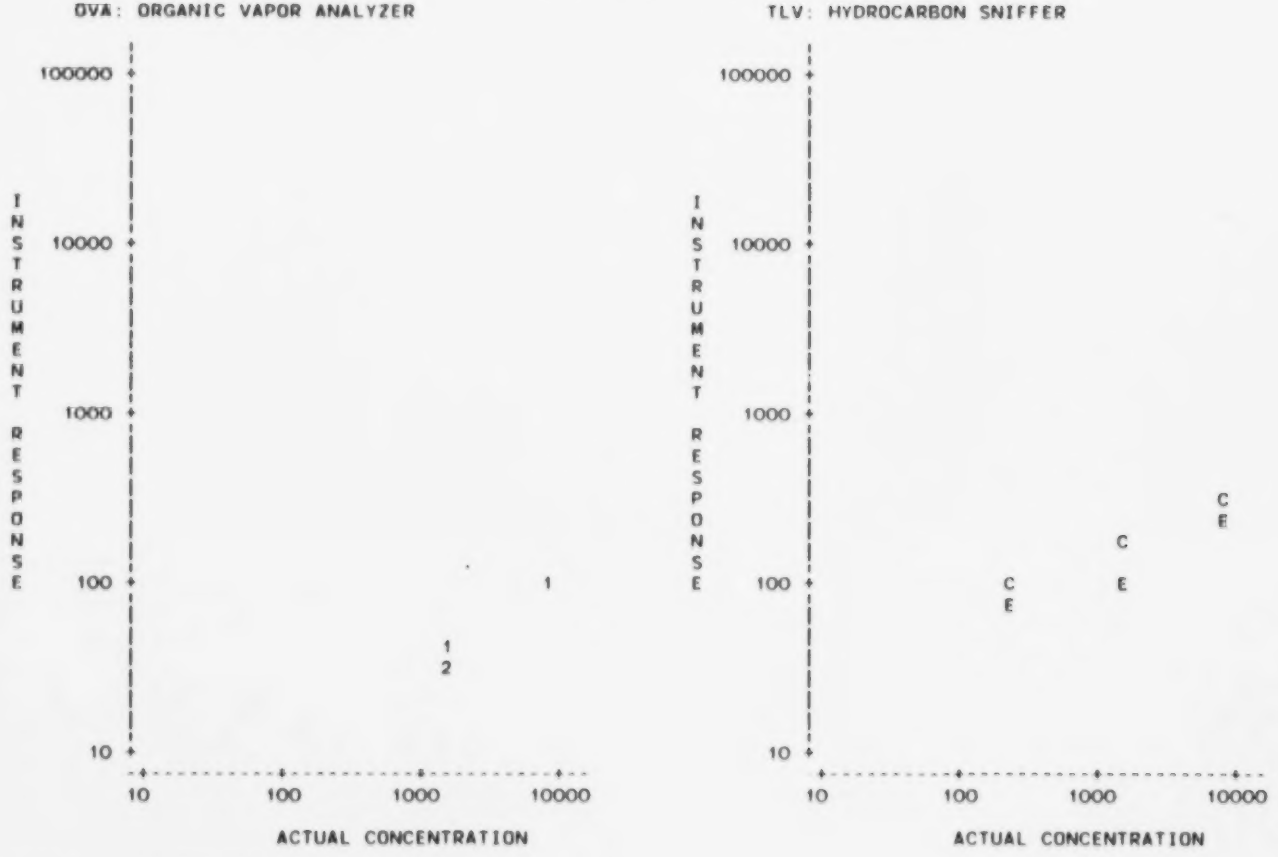
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	212	212	212	2.52	0.36	2	2.88		1	2.16		1						
1500	1489	1489	1489	10.49	2.33	2	12.82		1	8.17		1						
8000	8470	8470	8470	30.83	4.58	2	35.41		1	26.25		1						
	OVERALL MEANS			14.61	0.40	6	17.03	9.62	3	12.19	7.24	3						

ESTIMATED AT 10,000 PPMV 34.34 95 % CONFIDENCE INTERVAL : (23.80,49.55)

Figure 5-63

INSTRUMENT RESPONSE VS CONCENTRATION

DICHLORO-1-PROPANOL,2,3-



NOTE: 2 OBS MISSING OR OUT OF RANGE

TABLE 5-64

RESPONSE FACTOR SUMMARY

DICHLORO-1-PROPENE,2 3-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	206	206	206	1.70	0.07	2	1.63		1	1.77		1						
1500	1518	1518	1518	1.45	0.07	2	1.39		1	1.52		1						
5500	5777	5777	5777	0.71	0.04	2	0.67		1	0.76		1						
8000	8093	8093	8093															
	OVERALL MEANS			1.29	0.01	6	1.23	0.29	3	1.35	0.31	3						

ESTIMATED AT 10,000 PPMV 0.70 95 % CONFIDENCE INTERVAL : (0.47, 1.05)

TLV INSTRUMENTS

RESPONSE FACTORS

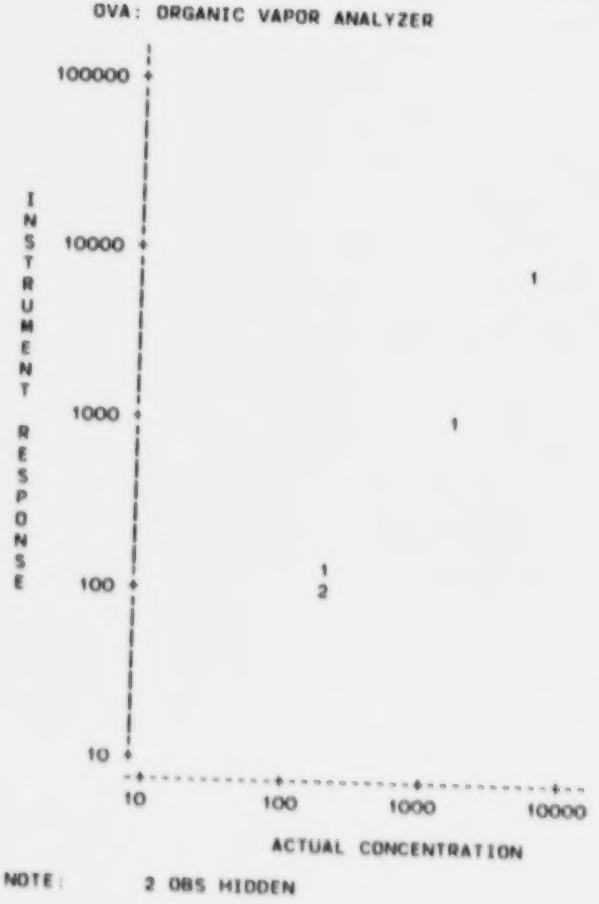
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	206	206	206	0.86		1				0.86		1						
1500	1518	1518	1518	1.59		1				1.59		1						
5500	5777	5777	5777	1.53	0.06	2	1.59		1	1.47		1						
8000	8093	8093	8093	1.39		1				1.39		1						
	OVERALL MEANS			1.38	0.02	5	1.59		1	1.33	0.16	4						

ESTIMATED AT 10,000 PPMV 1.62 95 % CONFIDENCE INTERVAL : (1.22, 2.14)

Figure 5-64

INSTRUMENT RESPONSE VS CONCENTRATION

DICHLORO-1-PROPENE,2,3-



NOTE: 2 OBS HIDDEN

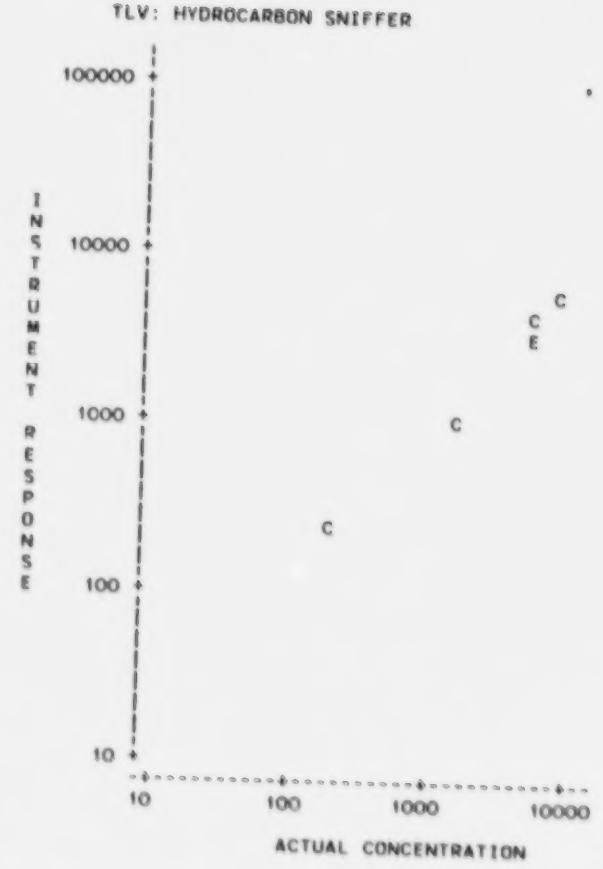


TABLE 5-65

RESPONSE FACTOR SUMMARY

DICHLORO-2-PROPANOL,1,3-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	224	224	224	13.22	2.79	2	10.43		1	16.01		1						
1500	1427	1427	1427	11.30	2.16	2	9.14		1	13.46		1						
5000	5225	5225	5225	36.96	1.18	2	38.14		1	35.78		1						
8000	7960	7960	7960	29.07	4.66	2	24.42		1	33.73		1						
OVERALL MEANS				22.64	0.26	8	20.53	6.81	4	24.75	5.82	4						

ESTIMATED AT 10,000 PPMV 29.34

95 % CONFIDENCE INTERVAL : (17.42,49.40)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	224	224	224	5.92	1.22	2	7.13		1	4.70		1						
1500	1427	1427	1427	6.75	0.78	2	5.96		1	7.53		1						
5000	5225	5225	5225	17.24	1.40	2	18.64		1	15.85		1						
8000	7960	7960	7960	19.59	1.58	2	21.17		1	18.01		1						
OVERALL MEANS				12.38	0.11	8	13.23	3.90	4	11.52	3.21	4						

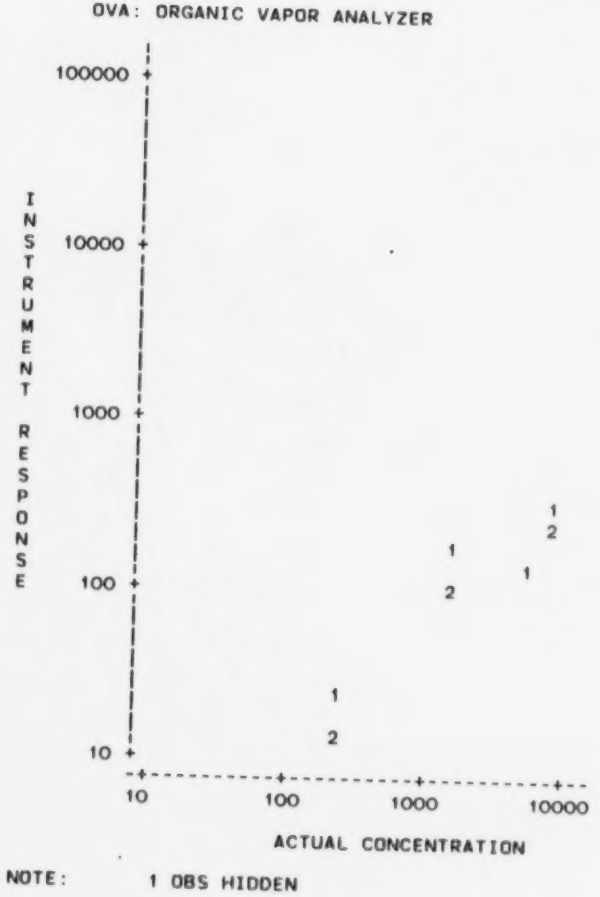
ESTIMATED AT 10,000 PPMV 18.63

95 % CONFIDENCE INTERVAL : (12.95,26.82)

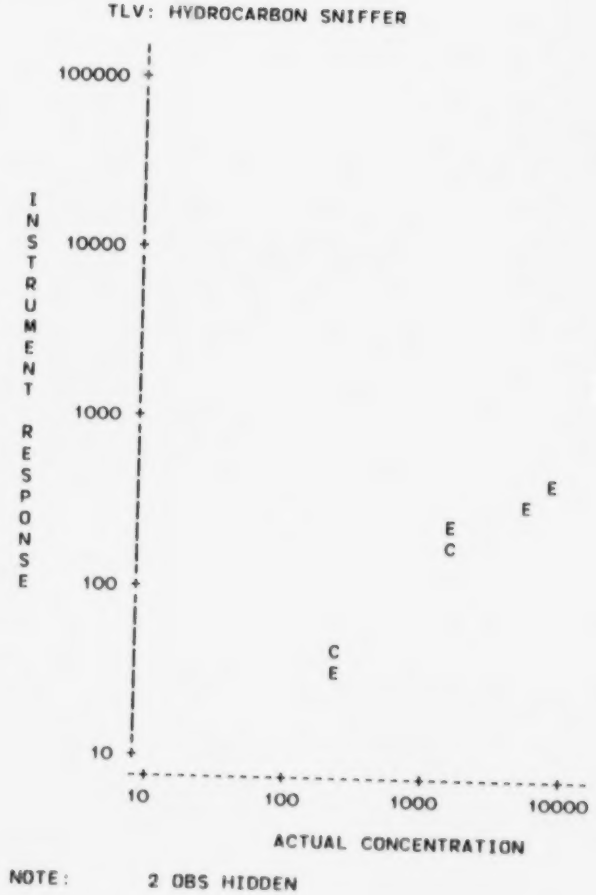
Figure 5-65

INSTRUMENT RESPONSE VS CONCENTRATION

DICHLORO-2-PROPANOL, 1,3-



NOTE: 1 OBS HIDDEN



NOTE: 2 OBS HIDDEN

TABLE 5-66

RESPONSE FACTOR SUMMARY

DICHLOROBENZENE,M-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	201	201	201	0.51	0.00	2	0.51		1	0.51		1						
1000	1000	1000	1000	0.59	0.00	2	0.59		1	0.59		1						
2000	1965	1965	1965	0.59	0.04	2	0.63		1	0.55		1						
			OVERALL MEANS	0.56	0.00	6	0.58	0.03	3	0.55	0.02	3						

ESTIMATED AT 10,000 PPMV 0.66

95 % CONFIDENCE INTERVAL : (0.56, 0.78)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	201	201	201	0.70		1										0.70		1
1000	1000	1000	1000	0.99		1										0.99		1
2000	1965	1965	1965	1.28		1										1.28		1
			OVERALL MEANS	0.99		3										0.99	0.17	3

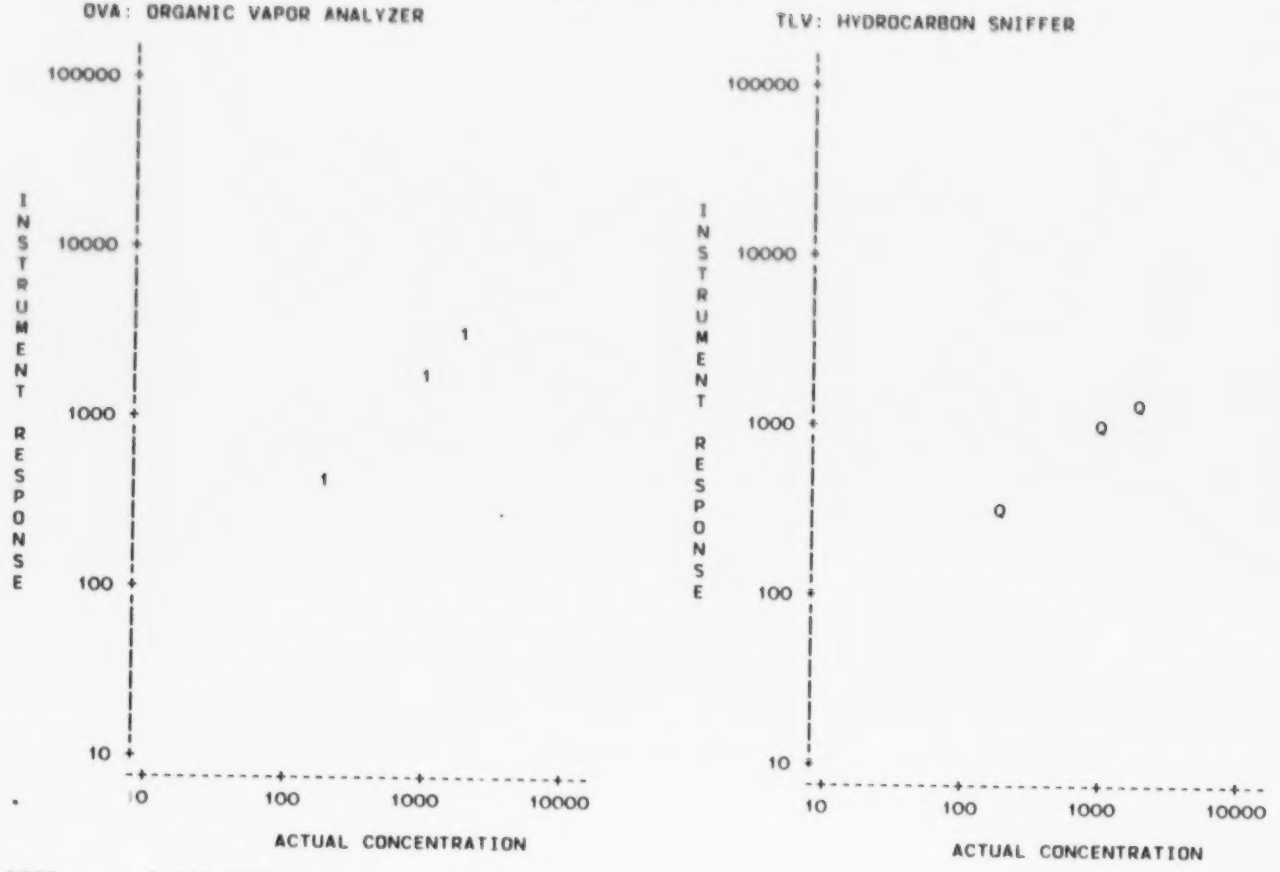
ESTIMATED AT 10,000 PPMV 1.89

95 % CONFIDENCE INTERVAL : (1.37, 2.60)

Figure 5-66

INSTRUMENT RESPONSE VS CONCENTRATION

DICHLOROBENZENE,M-



NOTE: 3 OBS HIDDEN

TABLE 5-67

RESPONSE FACTOR SUMMARY

DICHLOROBENZENE,O-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	212	212	212	0.50	0.02	2	0.48		1	0.52		1						
700	707	707	707	0.61	0.03	2	0.58		1	0.65		1						
1250	1215	1215	1215	0.56	0.03	2	0.53		1	0.59		1						
			OVERALL MEANS	0.56	0.00	6	0.53	0.03	3	0.59	0.04	3						
			ESTIMATED AT 10,000 PPMV	0.70			95 % CONFIDENCE INTERVAL : (0.48, 1.03)											

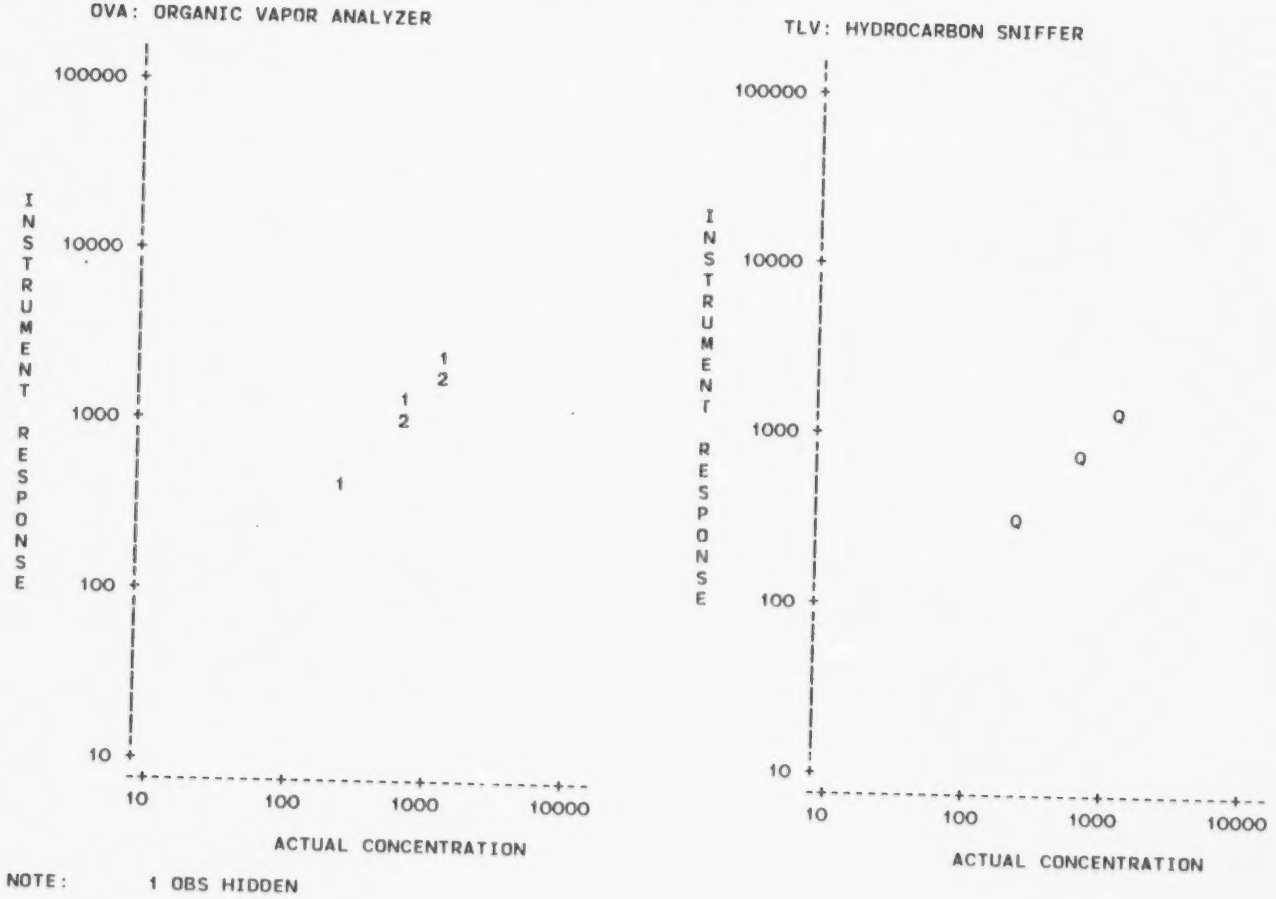
TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	212	212	212	0.72		1										0.72		1
700	707	707	707	0.90		1										0.90		1
1250	1215	1215	1215	0.89		1										0.89		1
			OVERALL MEANS	0.84		3										0.84	0.06	3
			ESTIMATED AT 10,000 PPMV	1.22			95 % CONFIDENCE INTERVAL : (0.80, 1.86)											

Figure 5-67

INSTRUMENT RESPONSE VS CONCENTRATION

DICHLOROBENZENE,O-



NOTE: 1 OBS HIDDEN

TABLE 5-68

RESPONSE FACTOR SUMMARY

DICHLOROETHANE, 1,1-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	221	221	221	0.88	0.14	2	0.75		1	1.02		1						
1500	1499	1499	1499	0.81	0.08	2	0.73		1	0.88		1						
5000	5570	5570	5570	0.80	0.00	2	0.80		1	0.80		1						
8000	7838	7838	7838															
		OVERALL MEANS		0.83	0.01	6	0.76	0.02	3	0.90	0.07	3						

ESTIMATED AT 10,000 PPMV 0.77 95 % CONFIDENCE INTERVAL : (0.60, 0.98)

TLV INSTRUMENTS

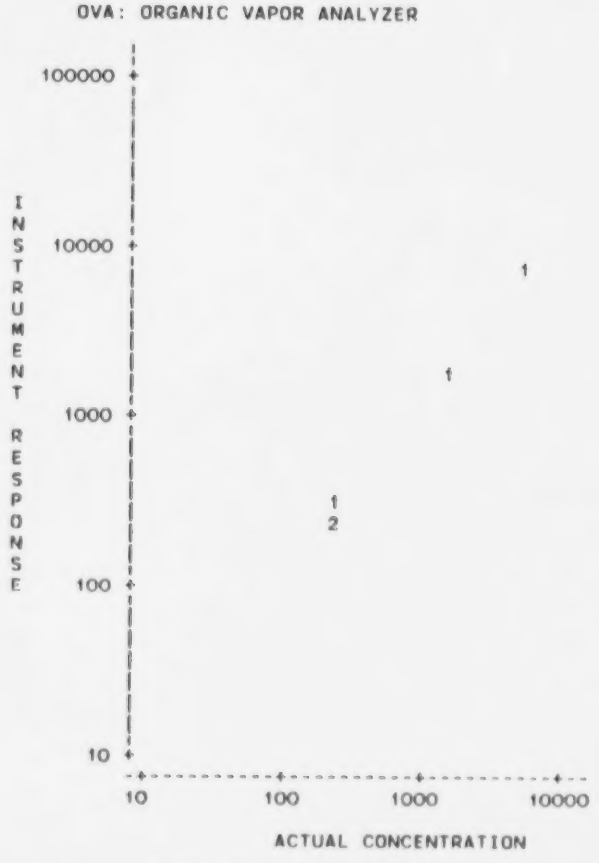
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	221	221	221	1.52	0.27	2	1.79		1	1.26		1						
1500	1499	1499	1499	1.67	0.04	2	1.71		1	1.63		1						
5000	5570	5570	5570	1.81	0.00	2	1.81		1	1.80		1						
8000	7838	7838	7838	1.74	0.00	2	1.74		1	1.75		1						
		OVERALL MEANS		1.69	0.01	8	1.76	0.02	4	1.61	0.12	4						

ESTIMATED AT 10,000 PPMV 1.80 95 % CONFIDENCE INTERVAL : (1.58, 2.06)

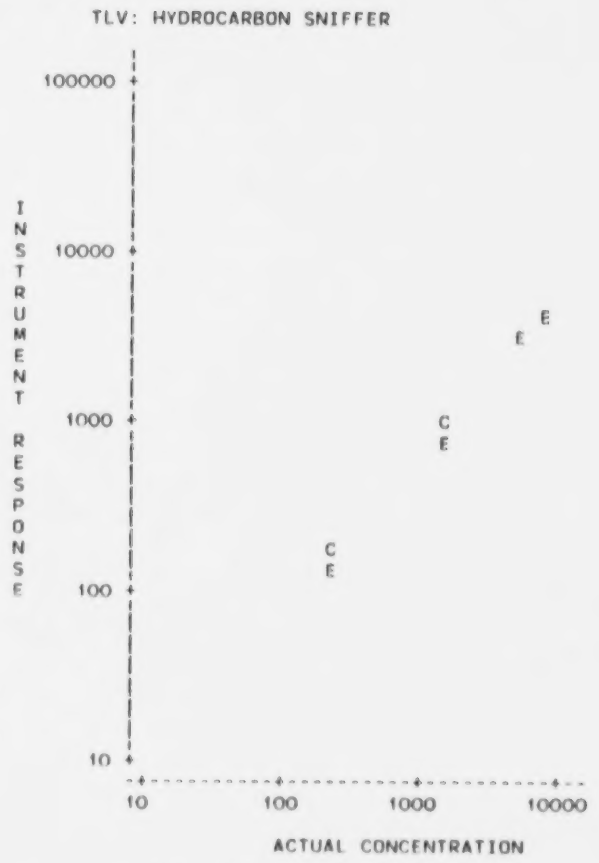
Figure 5-68

INSTRUMENT RESPONSE VS CONCENTRATION

DICHLOROETHANE, 1, 1-



NOTE: 2 OBS HIDDEN



NOTE: 2 OBS HIDDEN

TABLE 5-69

RESPONSE FACTOR SUMMARY

DICHLOROETHANE, 1,2-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	208	208	208	1.04	0.03	2	1.01		1	1.07		1						
1500	1579	1579	1579	1.20	0.02	2	1.22		1	1.17		1						
8000	8913	8913	8913	0.89	0.00	2	0.89		1	0.89		1						
		OVERALL MEANS		1.04	0.00	6	1.04	0.10	3	1.04	0.08	3						

ESTIMATED AT 10,000 PPMV 0.95 95 % CONFIDENCE INTERVAL : (0.77, 1.18)

TLV INSTRUMENTS

RESPONSE FACTORS

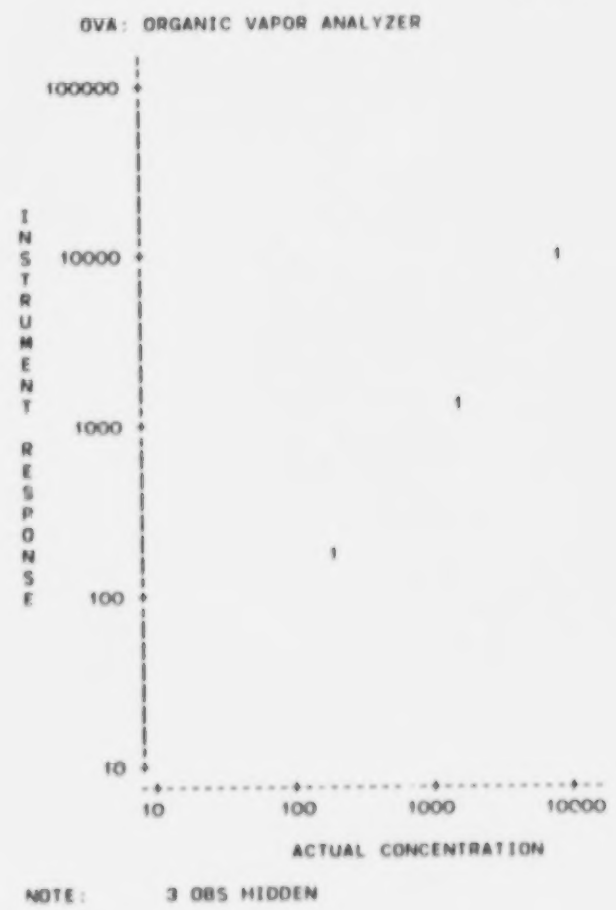
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	208	208	208	1.74	0.24	2	1.98		1	1.50		1						
1500	1579	1579	1579	2.07	0.06	2	2.14		1	2.01		1						
8000	8913	8913	8913	2.01	0.01	2	2.01		1	2.02		1						
		OVERALL MEANS		1.94	0.02	6	2.04	0.05	3	1.84	0.17	3						

ESTIMATED AT 10,000 PPMV 2.08 95 % CONFIDENCE INTERVAL : (1.73, 2.51)

Figure 5-69

INSTRUMENT RESPONSE VS CONCENTRATION

DICHLOROETHANE, 1,2-



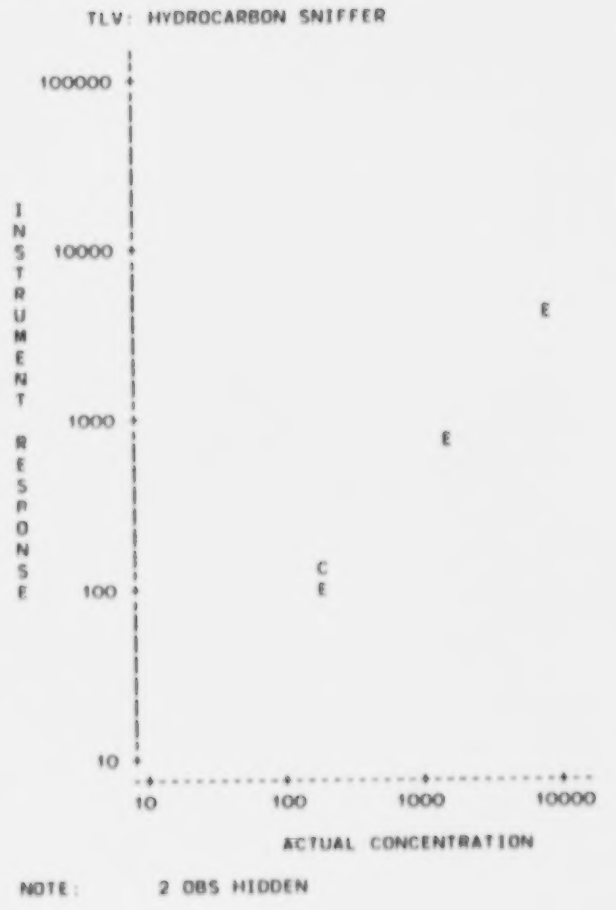


TABLE 5-70

RESPONSE FACTOR SUMMARY

DICHLOROETHYLENE,CIS1,2-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	218	218	218	2.02	0.14	2	2.16		1	1.88		1						
1500	1492	1492	1492	1.89	0.11	2	2.00		1	1.79		1						
5000	4988	4988	4988	1.62	0.01	2	1.64		1	1.61		1						
8000	7795	7795	7795	1.16	0.04	2	1.11		1	1.20		1						
			OVERALL MEANS	1.67	0.01	8	1.73	0.23	4	1.62	0.15	4						

ESTIMATED AT 10,000 PPMV 1.31 95 % CONFIDENCE INTERVAL : (1.08, 1.58)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	218	218	218	10.75	6.55	2	4.20		1	17.29		1						
1500	1492	1492	1492	4.11	1.48	2	2.63		1	5.60		1						
5000	4988	4988	4988	2.36	0.07	2	2.43		1	2.29		1						
8000	7795	7795	7795	2.92	0.55	2	2.38		1	3.47		1						
			OVERALL MEANS	5.04	0.27	8	2.91	0.43	4	7.16	3.45	4						

ESTIMATED AT 10,000 PPMV 1.93 95 % CONFIDENCE INTERVAL : (1.02, 3.66)

Figure 5-70

INSTRUMENT RESPONSE VS CONCENTRATION

DICHLOROETHYLENE,CIS1,2-

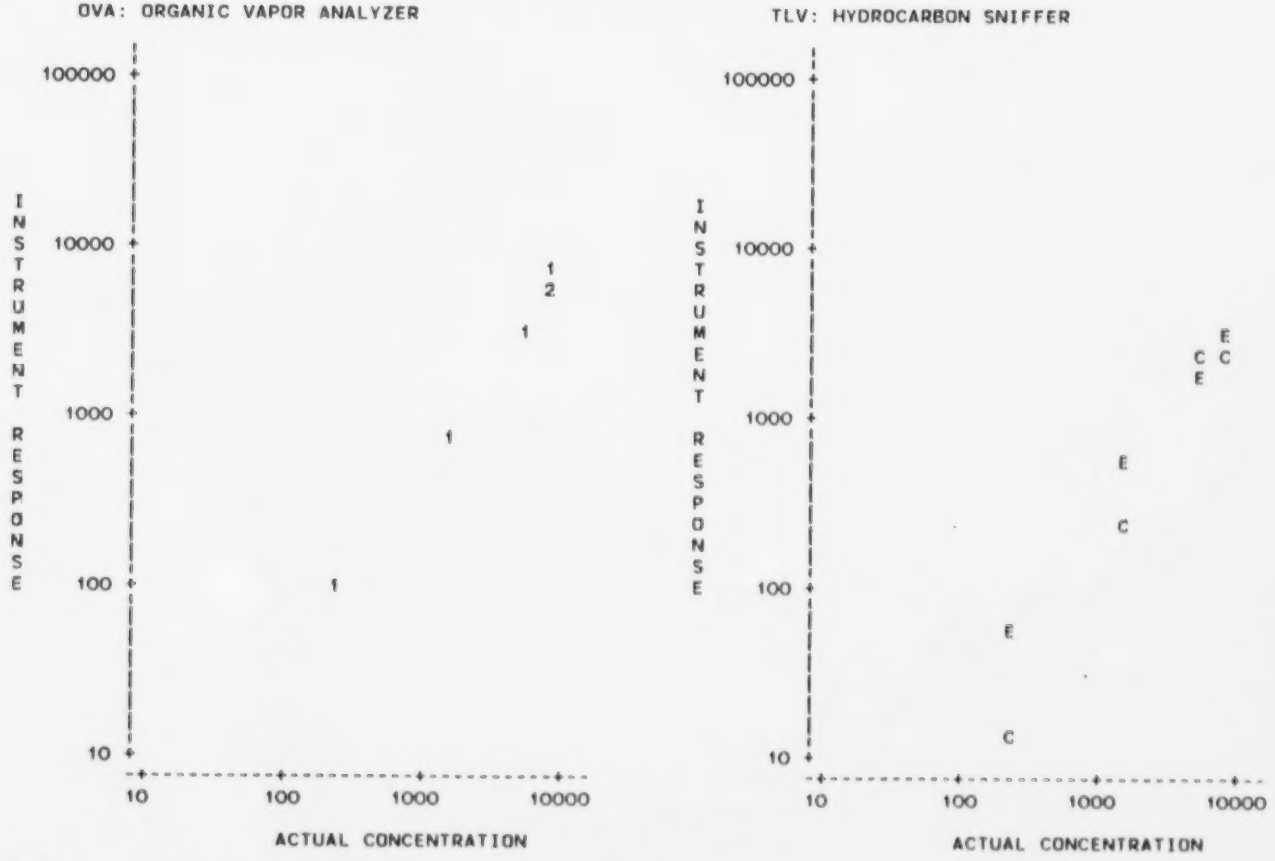


TABLE 5-71

RESPONSE FACTOR SUMMARY

DICHLOROETHYLENE,TRANS1,2

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	235	235	235	2.26	0.04	2	2.31		1	2.22		1						
500	617	617	617	2.16	0.08	2	2.08		1	2.24		1						
1500	1404	1404	1404	1.81	0.07	2	1.88		1	1.74		1						
8000	7693	7693	7693	1.14	0.04	2	1.18		1	1.10		1						
		OVERALL MEANS		1.85	0.00	8	1.86	0.24	4	1.83	0.27	4						

ESTIMATED AT 10,000 PPMV 1.13 95 % CONFIDENCE INTERVAL : (0.99, 1.30)

TLV INSTRUMENTS

RESPONSE FACTORS

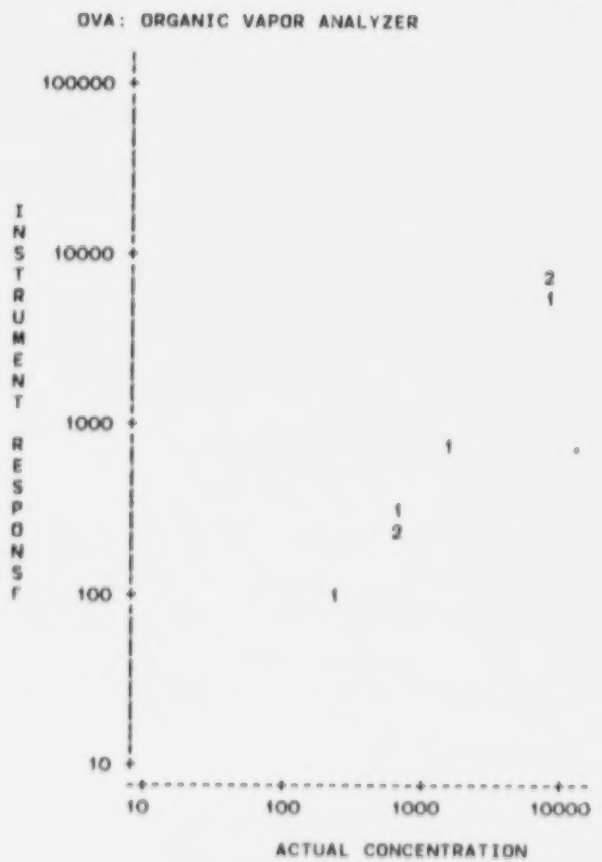
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	235	235	235	12.28	8.70	2	3.59		1	20.98		1						
500	617	617	617	2.54	0.28	2	2.82		1	2.25		1						
1500	1404	1404	1404	4.80	2.35	2	2.45		1	7.15		1						
8000	7693	7693	7693	3.06	0.72	2	2.34		1	3.78		1						
		OVERALL MEANS		5.67	0.36	8	2.80	0.28	4	8.54	4.27	4						

ESTIMATED AT 10,000 PPMV 1.86 95 % CONFIDENCE INTERVAL : (0.55, 6.29)

Figure 5-71

INSTRUMENT RESPONSE VS CONCENTRATION

DICHLOROETHYLENE, TRANS1,2



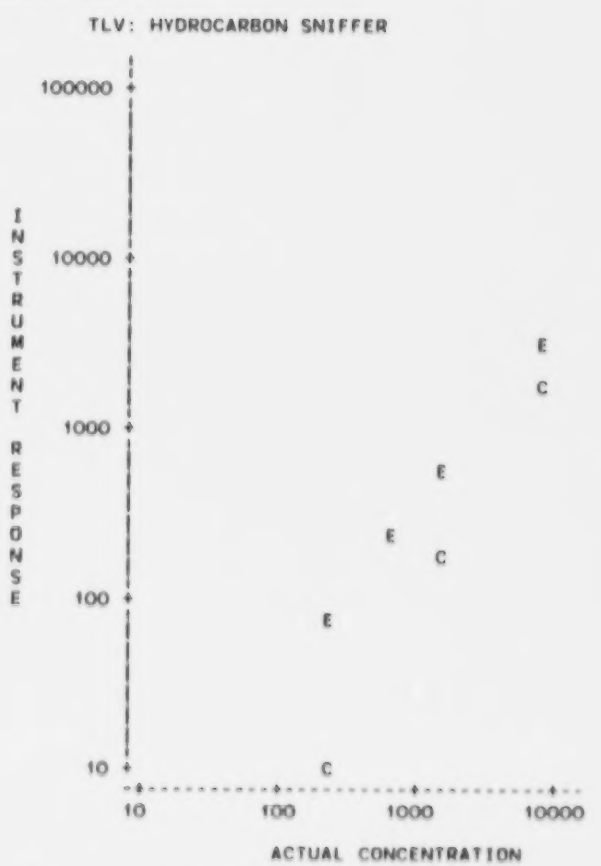


TABLE 5-72

RESPONSE FACTOR SUMMARY

DICHLOROMETHANE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	214	214	214	1.07	0.02	2	1.05		1	1.09		1						
1500	1573	1573	1573	1.40	0.03	2	1.37		1	1.44		1						
8000	7935	7935	7935	2.29	0.08	2	2.21		1	2.37		1						
			OVERALL MEANS	1.59	0.01	6	1.54	0.35	3	1.63	0.38	3						

ESTIMATED AT 10,000 PPMV 2.26 95 % CONFIDENCE INTERVAL : (1.94, 2.64)

TLV INSTRUMENTS

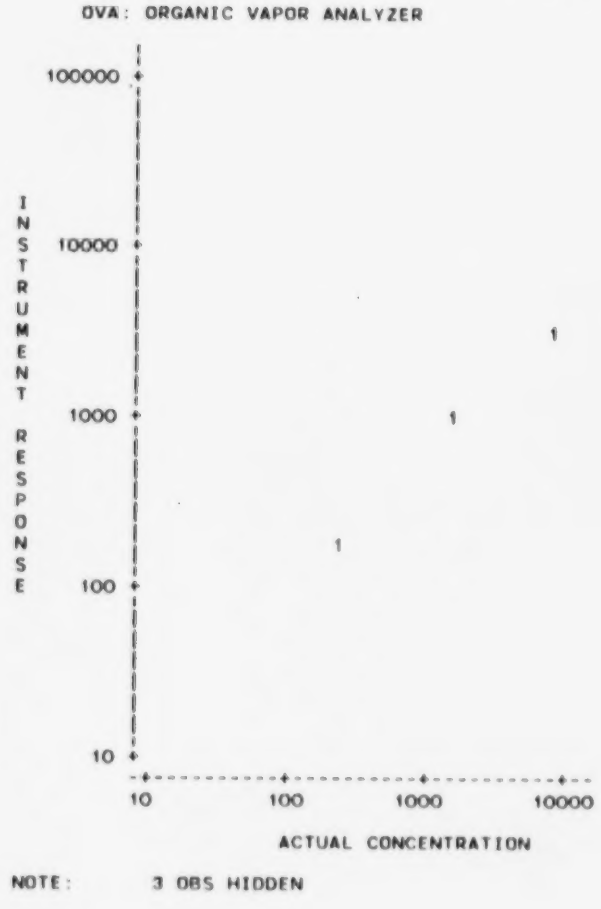
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	214	214	214	3.14	0.72	2	3.86		1	2.42		1						
1500	1573	1573	1573	3.50	0.21	2	3.71		1	3.30		1						
8000	7935	7935	7935	3.58	0.05	2	3.63		1	3.53		1						
			OVERALL MEANS	3.41	0.05	6	3.73	0.07	3	3.08	0.34	3						

ESTIMATED AT 10,000 PPMV 3.63 95 % CONFIDENCE INTERVAL : (2.72, 4.84)

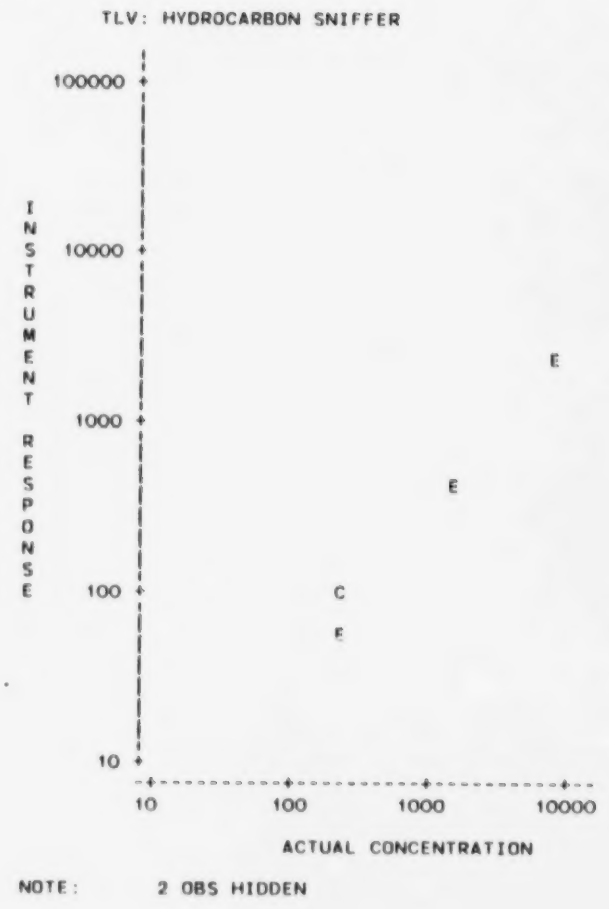
Figure 5-72

INSTRUMENT RESPONSE VS CONCENTRATION

DICHLOROMETHANE



NOTE: 3 OBS HIDDEN



NOTE: 2 OBS HIDDEN

TABLE 5-73

RESPONSE FACTOR SUMMARY

DICHLOROPROPANE, 1,2-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	223	223	223	1.46	0.19	2	1.27		1	1.64		1						
1500	1448	1448	1448	1.30	0.09	2	1.21		1	1.38		1						
6000	5969	5969	5969	1.06	0.08	2	1.15		1	0.98		1						
8000	7722	7722	7722															
		OVERALL MEANS		1.27	0.01	6	1.21	0.03	3	1.34	0.19	3						

ESTIMATED AT 10,000 PPMV 1.03 95 % CONFIDENCE INTERVAL : (0.82, 1.29)

TLV INSTRUMENTS

RESPONSE FACTORS

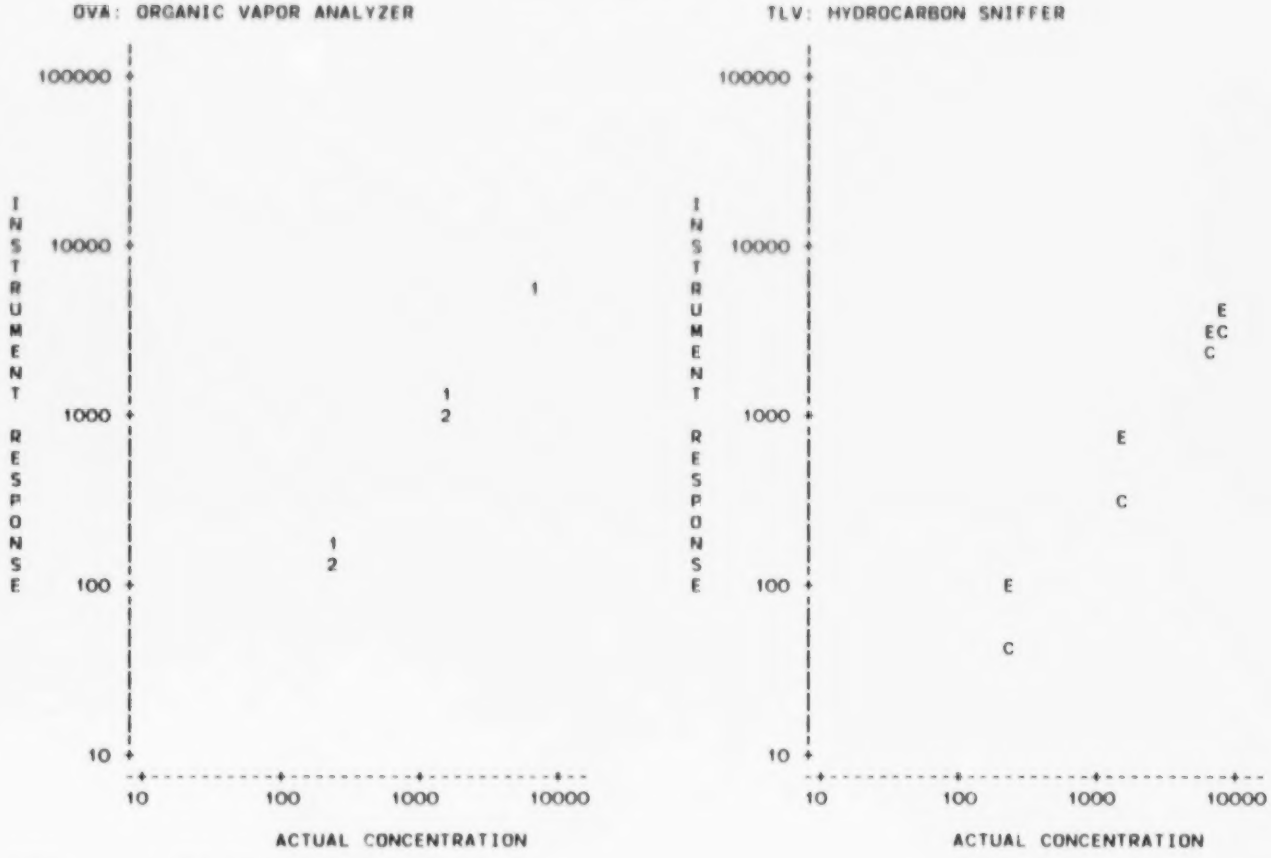
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	223	223	223	3.98	1.71	2	2.27		1	5.69		1						
1500	1448	1448	1448	3.19	1.30	2	1.89		1	4.49		1						
6000	5969	5969	5969	2.13	0.23	2	1.90		1	2.36		1						
8000	7722	7722	7722	1.96	0.24	2	1.71		1	2.20		1						
		OVERALL MEANS		2.81	0.11	8	1.94	0.12	4	3.69	0.85	4						

ESTIMATED AT 10,000 PPMV 1.80 95 % CONFIDENCE INTERVAL : (1.12, 2.89)

Figure 5-73

INSTRUMENT RESPONSE VS CONCENTRATION

DICHLOROPROPANE, 1,2-



NOTE: 1 OBS HIDDEN

TABLE 5-74

RESPONSE FACTOR SUMMARY

DIISOBUTYLENE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	222	222	222	0.96	0.06	2	0.90		1	1.03		1						
1500	1558	1558	1558	0.58	0.02	2	0.56		1	0.60		1						
3000	3156	3156	3156	0.33	0.02	2	0.32		1	0.35		1						
4000	3815	3815	3815															
8000	8613	8613	8613															
		OVERALL MEANS		0.62	0.01	6	0.59	0.17	3	0.66	0.20	3						

ESTIMATED AT 10,000 PPMV 0.24 95 % CONFIDENCE INTERVAL : (0.17, 0.35)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	222	222	222	1.59	0.77	2							2.36		1	0.81		1
1500	1558	1558	1558	1.25	0.26	2							1.52		1	0.99		1
3000	3156	3156	3156	1.49	0.23	2							1.72		1	1.25		1
4000	3815	3815	3815	1.36	0.19	2							1.55		1	1.17		1
8000	8613	8613	8613	1.59	0.04	2							1.62		1	1.55		1
		OVERALL MEANS		1.45	0.03	10							1.75	0.16	5	1.15	0.12	5

ESTIMATED AT 10,000 PPMV 1.39 95 % CONFIDENCE INTERVAL : (0.97, 2.01)

Figure 5-74

INSTRUMENT RESPONSE VS CONCENTRATION

DIISOBUTYLENE

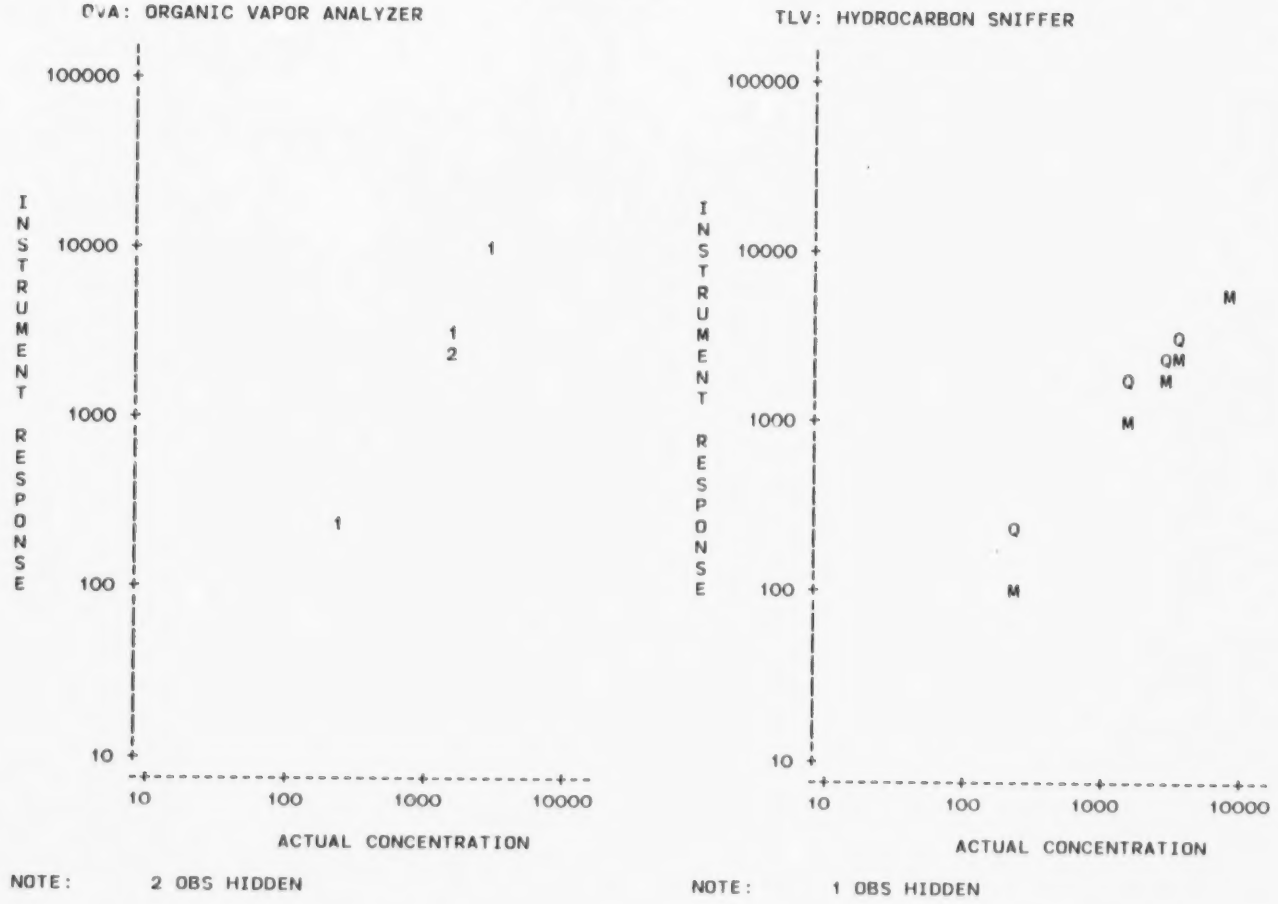


TABLE 5-75

RESPONSE FACTOR SUMMARY

DIISOPROPYL BENZENE,1,3-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	38	38	38	1.24	0.09	2	1.15		1	1.33		1						
500	502	502	502	1.50	0.06	2	1.56		1	1.45		1						
8000	7919	7919	7919	13.60	1.17	2	14.77		1	12.43		1						
		OVERALL MEANS		5.45	0.06	6	5.83	4.48	3	5.07	3.68	3						

ESTIMATED AT 10,000 PPMV 9.43

95 % CONFIDENCE INTERVAL : (3.68,24.18)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
50	38	38	38	1.65	0.48	2	2.13		1	1.17		1						
500	502	502	502	3.55	1.56	2	5.10		1	1.99		1						
8000	7919	7919	7919	53.97	35.2	2	89.12		1	18.81		1						
		OVERALL MEANS		19.72	2.07	6	32.12	28.5	3	7.33	5.75	3						

ESTIMATED AT 10,000 PPMV 24.96

95 % CONFIDENCE INTERVAL : (6.07,102.7)

Figure 5-75

INSTRUMENT RESPONSE VS CONCENTRATION

DIISOPROPYL BENZENE, 1,3-

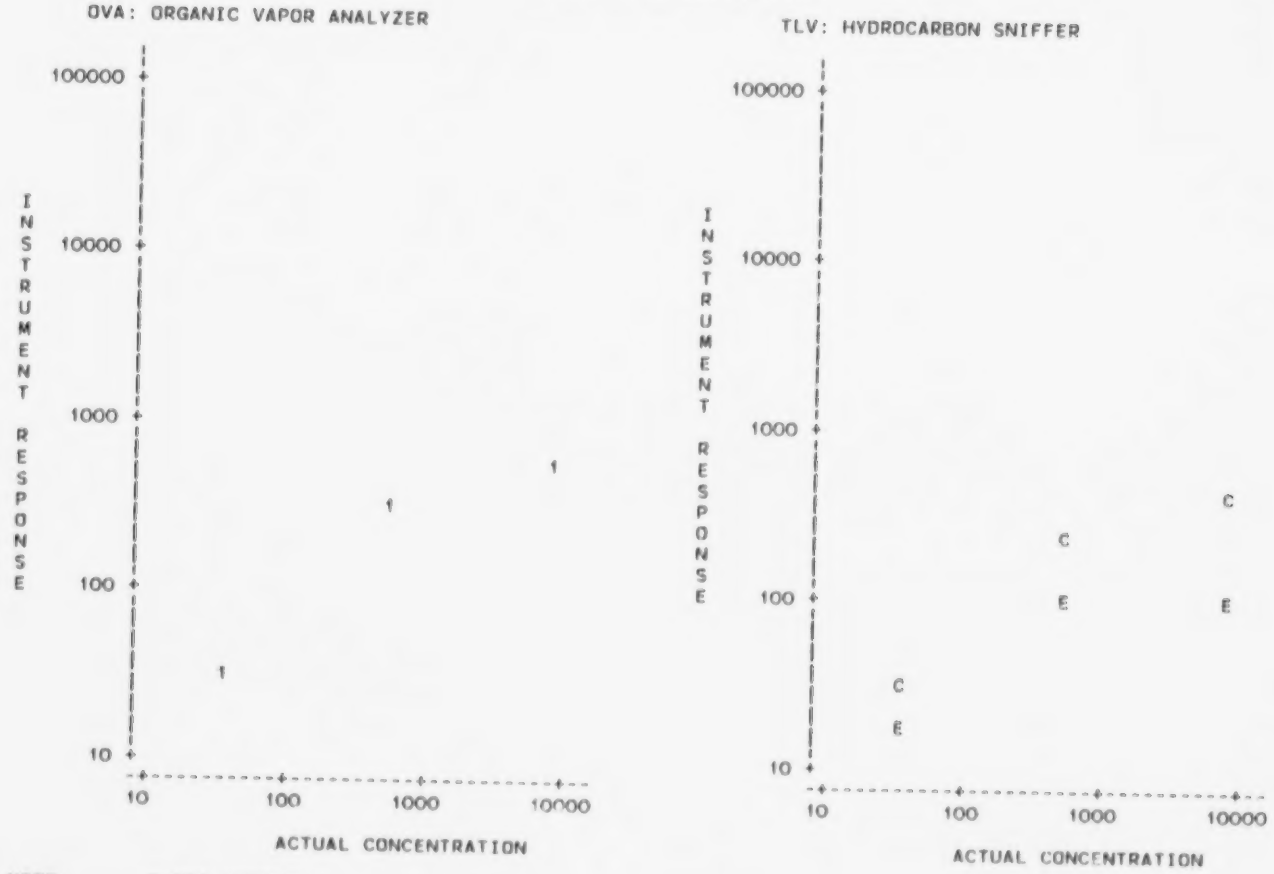


TABLE 5-76

RESPONSE FACTOR SUMMARY

DIMETHOXY ETHANE,1,2-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	202	202	202	3.25	1.23	2							2.02		1	4.48		1
1500	1537	1537	1537	3.47	0.62	2							2.85		1	4.09		1
8000	7578	7578	7578	1.22	0.12	2							1.10		1	1.34		1
		OVERALL MEANS		2.65	0.11	6							1.99	0.50	3	3.30	0.99	3
	ESTIMATED AT 10,000 PPMV			1.28			95 % CONFIDENCE INTERVAL : (0.57, 2.90)											

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	202	202	202	0.78		1				0.78		1						
1500	1537	1537	1537	1.14		1				1.14		1						
8000	7578	7578	7578	1.33		1				1.33		1						
		OVERALL MEANS		1.08		3				1.08	0.16	3						
	ESTIMATED AT 10,000 PPMV			1.43			95 % CONFIDENCE INTERVAL : (1.16, 1.75)											

Figure 5-76

INSTRUMENT RESPONSE VS CONCENTRATION

DIMETHOXY ETHANE, 1,2-

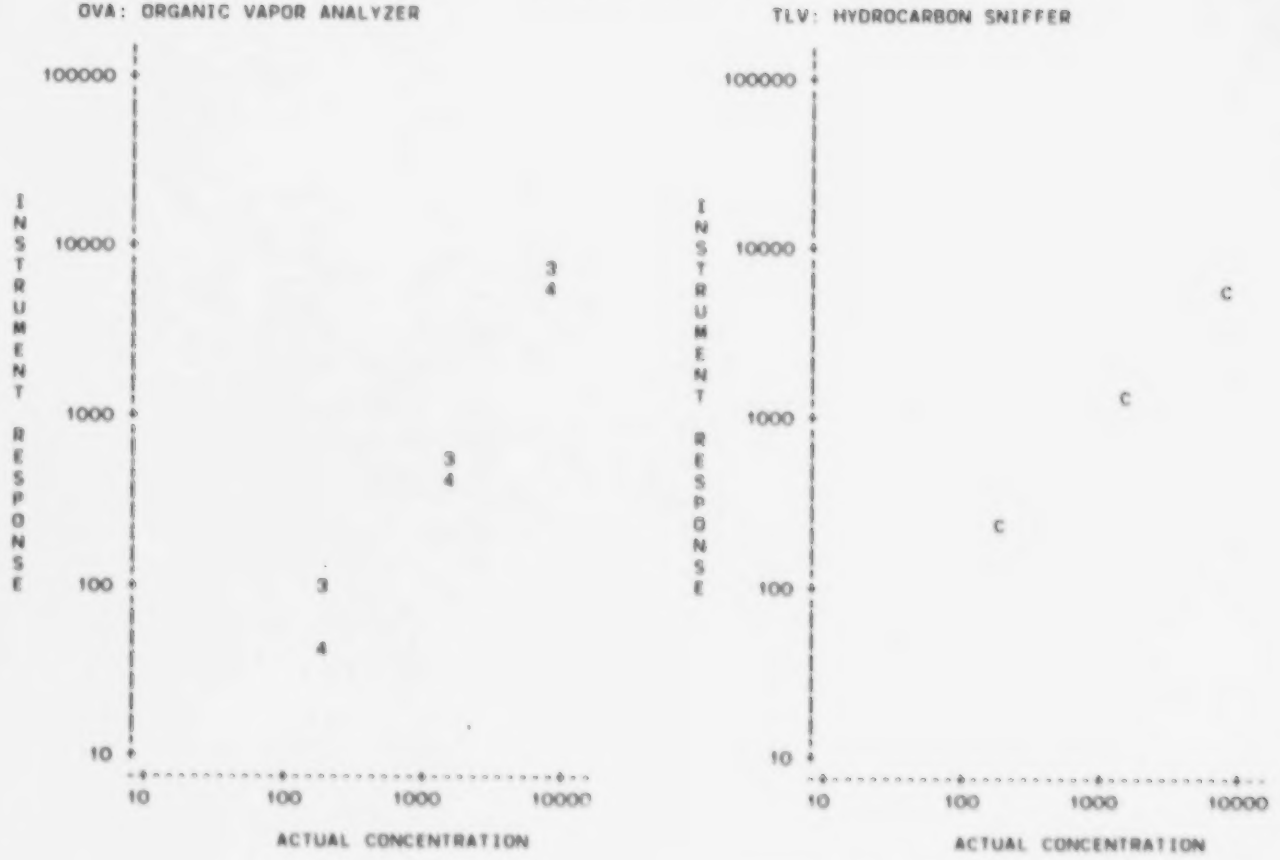


TABLE 5-77

RESPONSE FACTOR SUMMARY

DIMETHYLFORMAMIDE,N,N-

GVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	218	218	218	3.33	0.03	2
1500	1524	1524	1524	3.14	0.13	2
4400	4325	4325	4325	4.04	0.09	2
			OVERALL MEANS	3.51	0.01	6
			ESTIMATED AT 10,000 PPMV	3.89		

RESPONSE FACTORS

GVA METERS 1080	SE	N	2254	SE	N	2199	SE	N	1813	SE	N
3.30		1	3.35		1						
3.27		1	3.02		1						
4.14		1	3.95		1						
3.57	0.28	3	3.44	0.27	3						

95 % CONFIDENCE INTERVAL : (3.11, 4.85)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	218	218	218	0.77		1
1500	1524	1524	1524	1.51		1
4400	4325	4325	4325	2.20		1
			OVERALL MEANS	1.49		3
			ESTIMATED AT 10,000 PPMV	2.95		

RESPONSE FACTORS

TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
									0.77		1
									1.51		1
									2.20		1
									1.49	0.41	3

95 % CONFIDENCE INTERVAL : (2.86, 3.03)

Figure 5-77

INSTRUMENT RESPONSE VS CONCENTRATION

DIMETHYLFORMAMIDE,N,N-

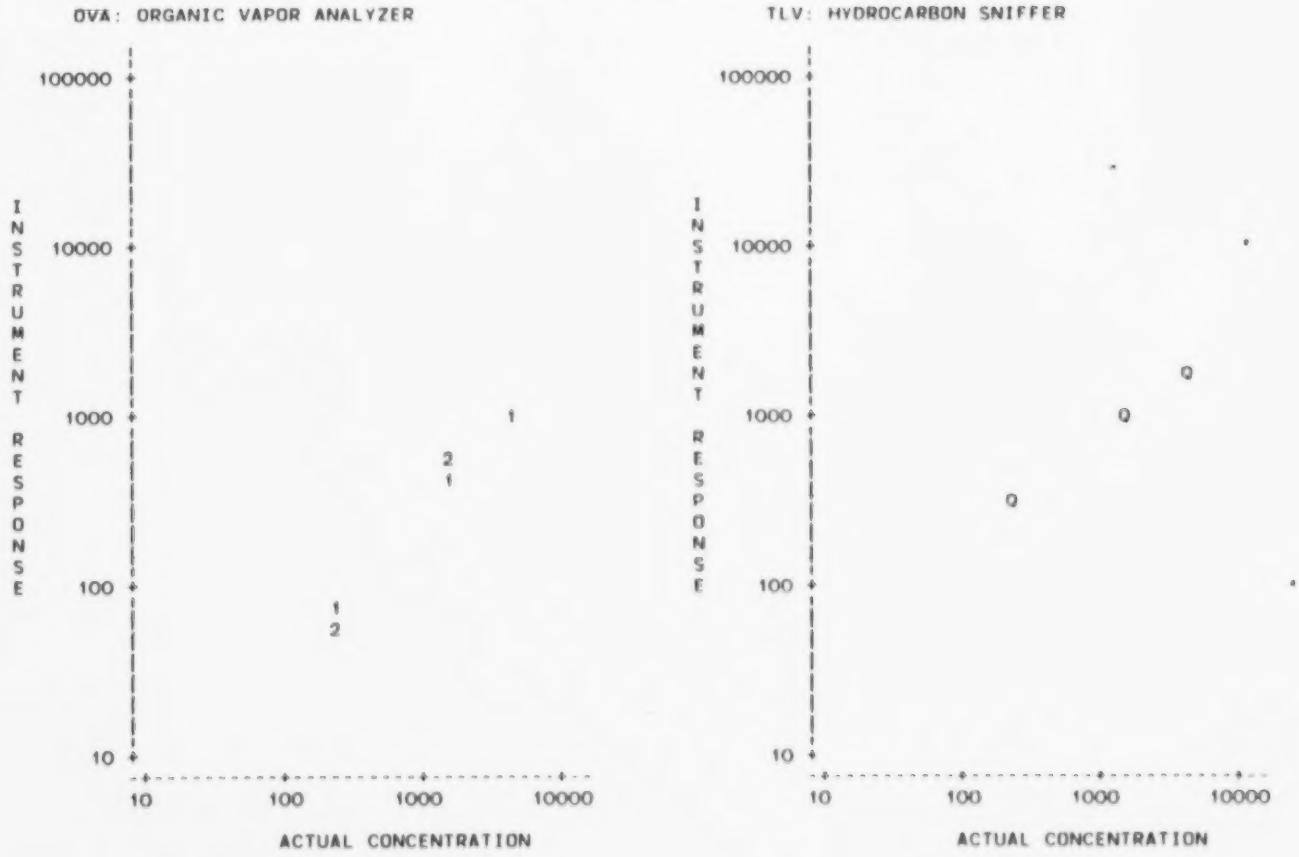


TABLE 5-78

RESPONSE FACTOR SUMMARY

DIMETHYLHYDRAZINE 1,1-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	226	226	226	5.33	0.31	2	5.02		1	5.64		1						
1500	1512	1512	1512	1.91	0.36	2	1.55		1	2.27		1						
8000	8527	8527	8527	1.26	0.14	2	1.12		1	1.40		1						
			OVERALL MEANS	2.83	0.05	6	2.56	1.23	3	3.10	1.29	3						

ESTIMATED AT 10,000 PPMV 1.04 95 % CONFIDENCE INTERVAL : (0.71, 1.52)

TLV INSTRUMENTS

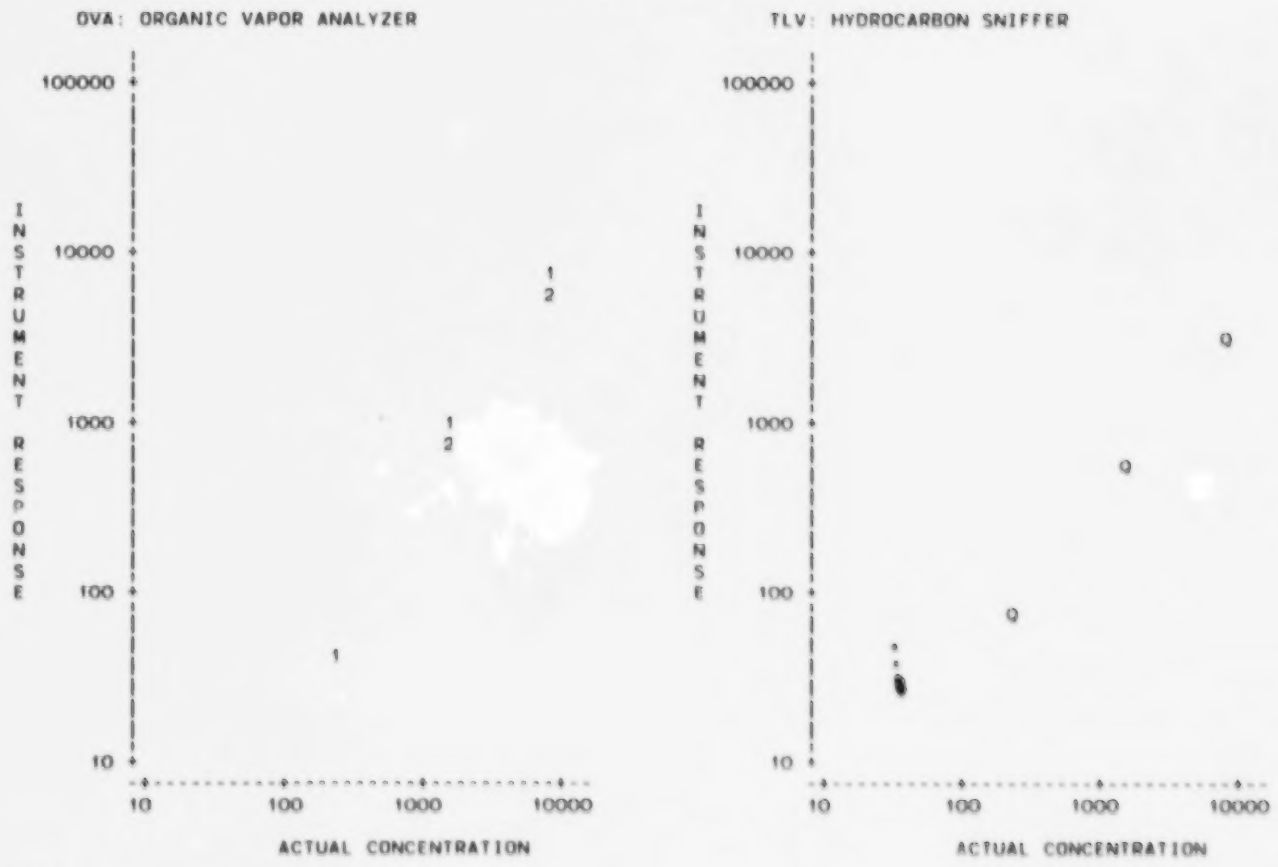
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	226	226	226	3.16		1										3.16		1
1500	1512	1512	1512	2.48		1										2.48		1
8000	8527	8527	8527	3.01		1										3.01		1
			OVERALL MEANS	2.88		3										2.88	0.21	3

ESTIMATED AT 10,000 PPMV 2.74 95 % CONFIDENCE INTERVAL : (1.61, 4.67)

Figure 5-78

INSTRUMENT RESPONSE VS CONCENTRATION

DIMETHYLHYDRAZINE 1,1-



NOTE: 1 OBS HIDDEN

TABLE 5-79

RESPONSE FACTOR SUMMARY

DIMETHYLSTYRENE,2,4-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	216	216	216	16.40	3.28	2	13.12		1	19.68		1						
1500	1625	1625	1625	24.79	4.22	2	20.57		1	29.02		1						
8000	8704	8704	8704	37.97	6.44	2	31.54		1	44.41		1						
			OVERALL MEANS	26.39	0.77	6	21.74	5.35	3	31.03	7.21	3						

ESTIMATED AT 10,000 PPMV 37.09 95 % CONFIDENCE INTERVAL : (25.75,53.42)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	216	216	216	5.71	1.03	2	6.74		1	4.67		1						
1500	1625	1625	1625	32.56	8.43	2	40.99		1	24.13		1						
8000	8704	8704	8704	75.22	30.9	2	106.1		1	44.31		1						
			OVERALL MEANS	37.83	2.24	6	51.28	29.1	3	24.37	11.4	3						

ESTIMATED AT 10,000 PPMV 78.06 95 % CONFIDENCE INTERVAL : (38.51,158.2)

Figure 5-79

INSTRUMENT RESPONSE VS CONCENTRATION

DIMETHYLSTYRENE,2,4-

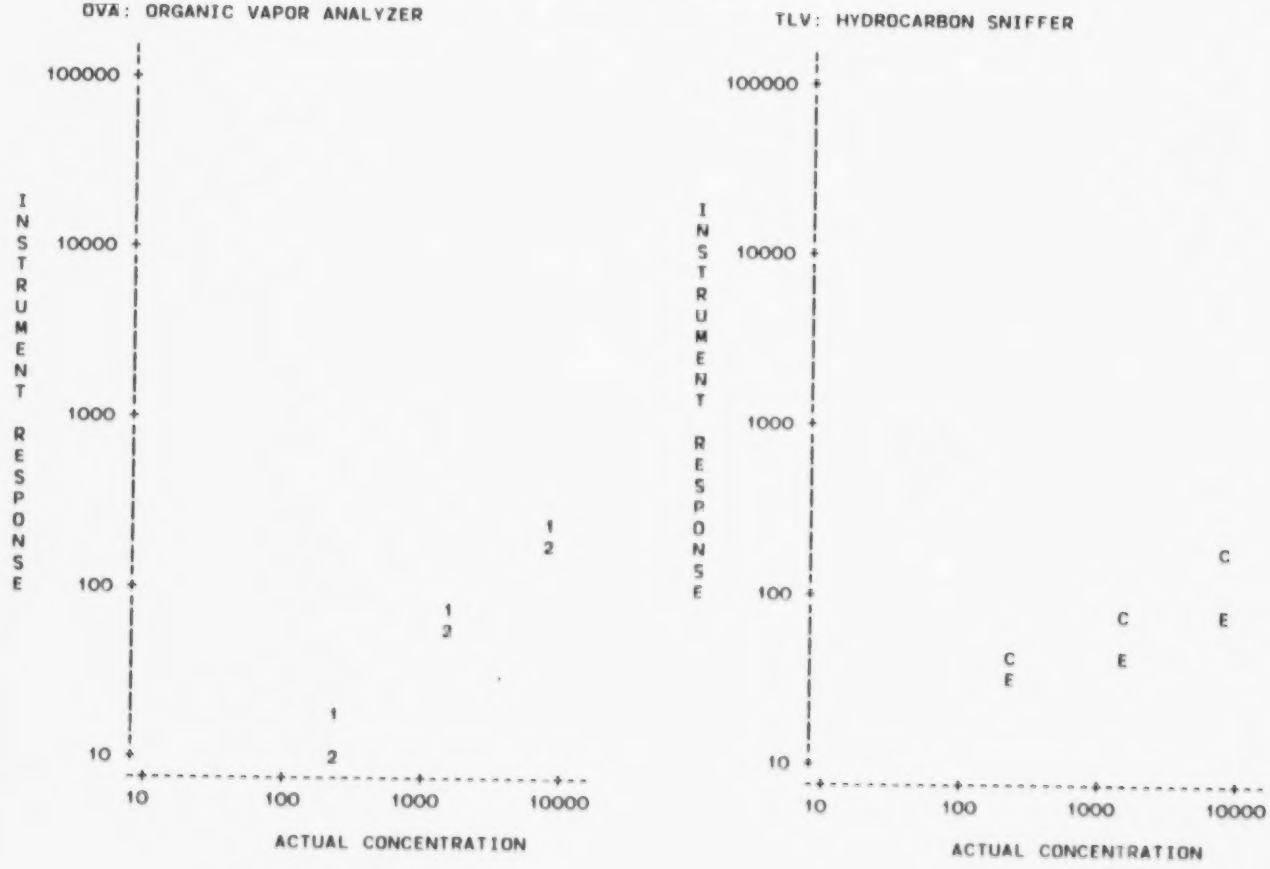


TABLE 5-80

RESPONSE FACTOR SUMMARY

DIMETHYLSULFOXIDE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	204	204	204	26.28	7.73	2	18.55		1	34.01		1						
300	313	313	313	43.48	8.70	2	34.79		1	52.18		1						
400	382	382	382	3.56	0.53	2	3.03		1	4.08		1						
			OVERALL MEANS	24.44	0.94	6	18.79	3.17	3	30.09	14	3						

ESTIMATED AT 10,000 PPMV 0.00 95 % CONFIDENCE INTERVAL : (0.00, 4301)

TLV INSTRUMENTS

RESPONSE FACTORS

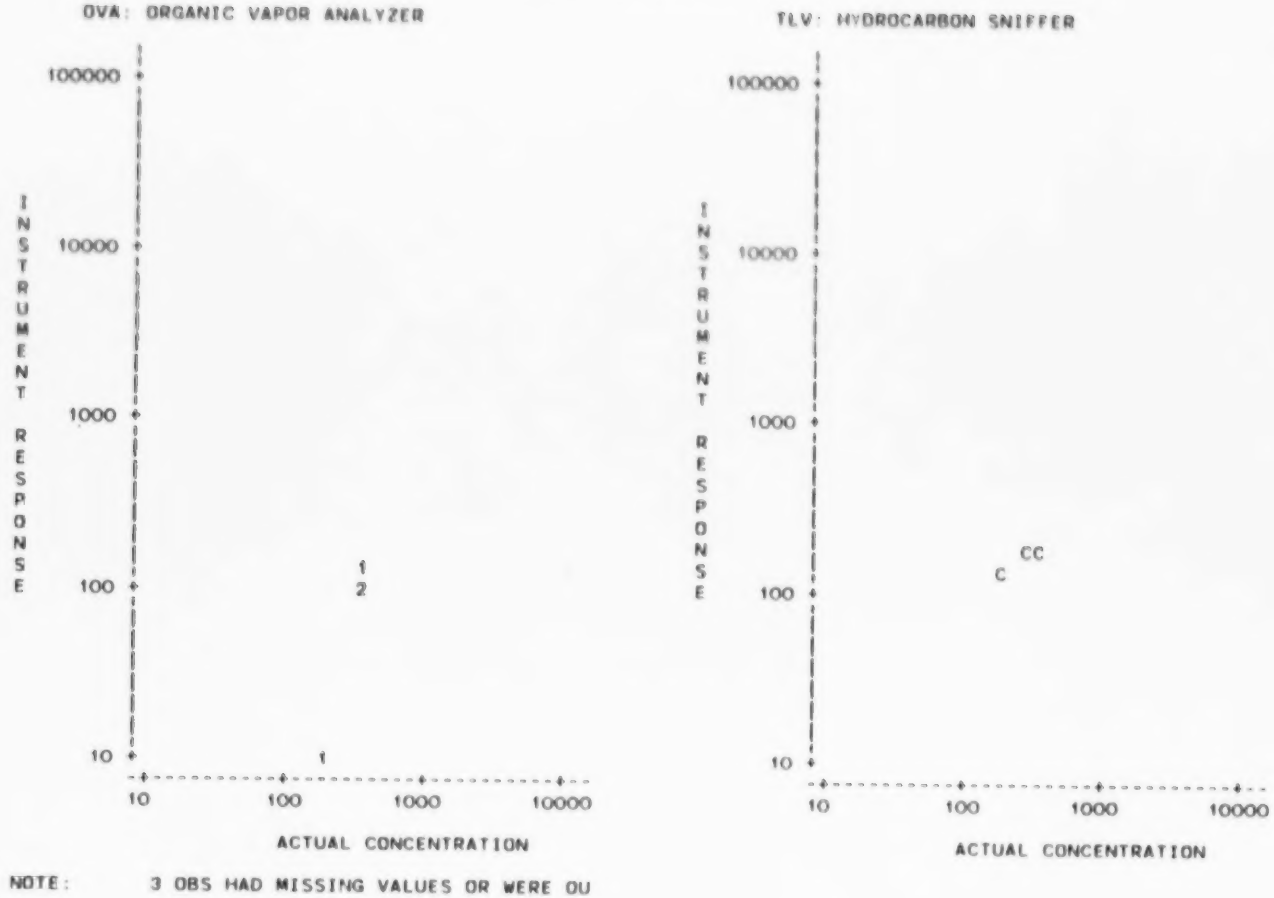
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	204	204	204	1.53		1				1.53		1						
300	313	313	313	1.65		1				1.65		1						
400	382	382	382	1.88		1				1.88		1						
			OVERALL MEANS	1.69		3				1.69	0.10	3						

ESTIMATED AT 10,000 PPMV 4.88 95 % CONFIDENCE INTERVAL : (1.41, 16.92)

Figure 5-80

INSTRUMENT RESPONSE VS CONCENTRATION

DIMETHYLSULFOXIDE



NOTE: 3 OBS HAD MISSING VALUES OR WERE OU

TABLE 5-81

RESPONSE FACTOR SUMMARY

DIOXANE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	209	209	209	2.80	0.01	2	2.79		1	2.81		1						
1500	1508	1508	1508	2.87	0.08	2	2.78		1	2.95		1						
8000	7687	7687	7687	1.48	0.00	2	1.48		1	1.48		1						
		OVERALL MEANS		2.38	0.01	6	2.35	0.44	3	2.41	0.47	3						

ESTIMATED AT 10,000 PPMV 1.58 95 % CONFIDENCE INTERVAL : (1.10, 2.28)

TLV INSTRUMENTS

RESPONSE FACTORS

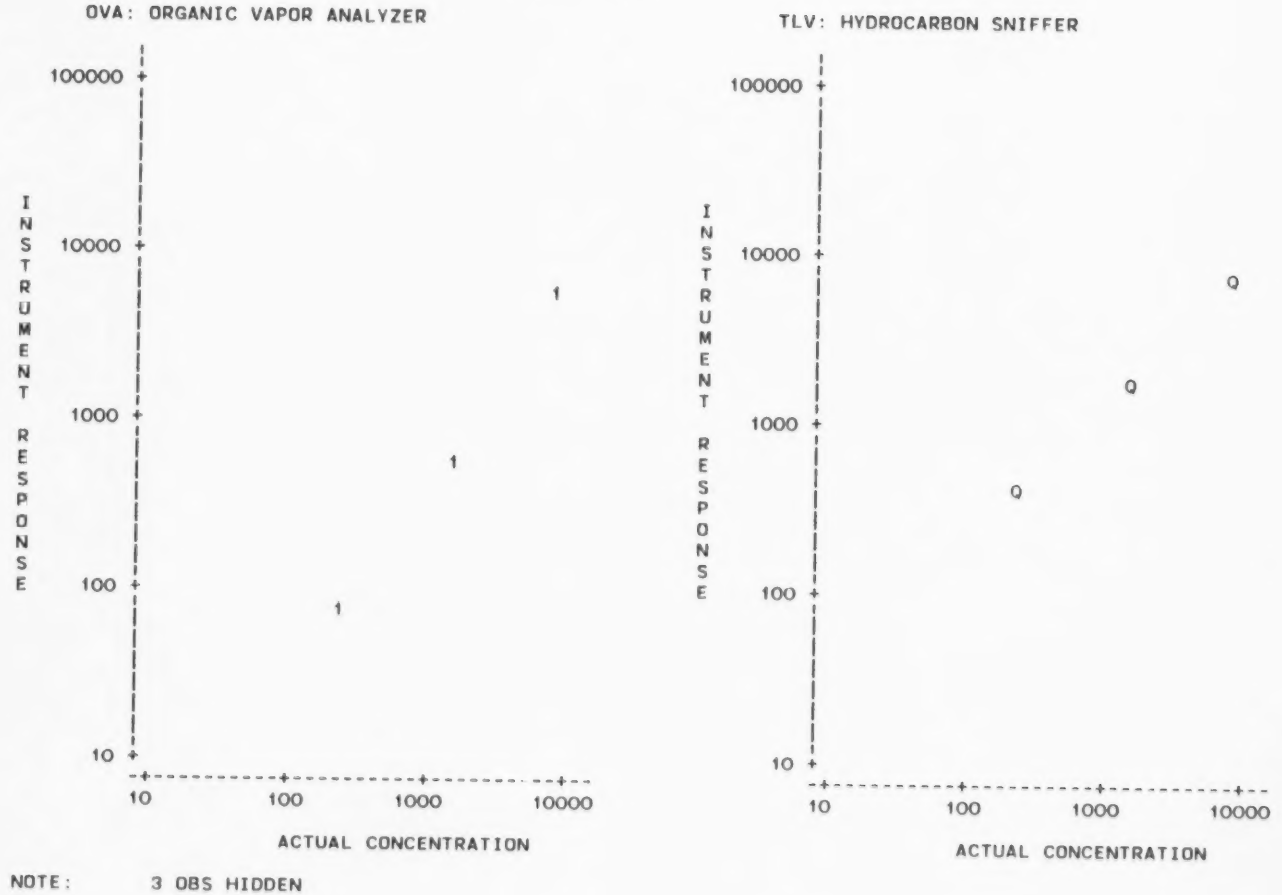
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	209	209	209	0.50		1										0.50		1
1500	1508	1508	1508	0.83		1										0.83		1
8000	7687	7687	7687	1.14		1										1.14		1
		OVERALL MEANS		0.82		3										0.82	0.18	3

ESTIMATED AT 10,000 PPMV 1.23 95 % CONFIDENCE INTERVAL : (1.07, 1.41)

Figure 5-81

INSTRUMENT RESPONSE VS CONCENTRATION

DIOXANE



NOTE: 3 OBS HIDDEN

TABLE 5-82

RESPONSE FACTOR SUMMARY

EPICHLOROHYDRIN

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	210	210	210	1.86	0.05	2	1.81		1	1.91		1						
1500	1511	1511	1511	1.84	0.06	2	1.79		1	1.90		1						
8000	8070	8070	8070	1.70	0.02	2	1.72		1	1.68		1						
		OVERALL MEANS		1.80	0.00	6	1.77	0.03	3	1.83	0.07	3						

ESTIMATED AT 10,000 PPMV 1.72 95 % CONFIDENCE INTERVAL : (1.61, 1.83)

TLV INSTRUMENTS

RESPONSE FACTORS

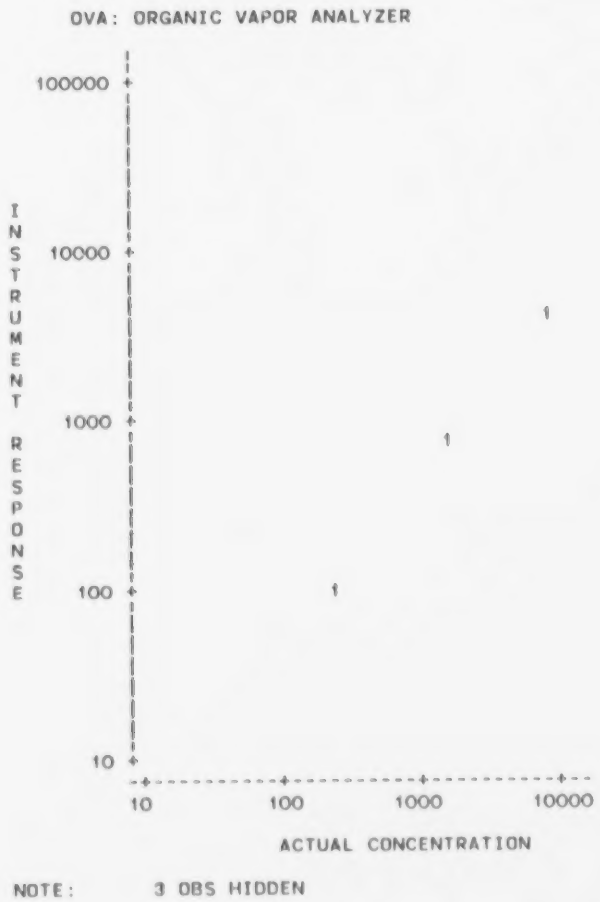
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	210	210	210	1.93	0.11	2	2.04		1	1.82		1						
1500	1511	1511	1511	2.08	0.05	2	2.13		1	2.03		1						
8000	8070	8070	8070	1.98	0.01	2	1.97		1	1.98		1						
		OVERALL MEANS		2.00	0.01	6	2.05	0.05	3	1.95	0.06	3						

ESTIMATED AT 10,000 PPMV 2.02 95 % CONFIDENCE INTERVAL : (1.84, 2.22)

Figure 5-82

INSTRUMENT RESPONSE VS CONCENTRATION

EPICHLOROHYDRIN



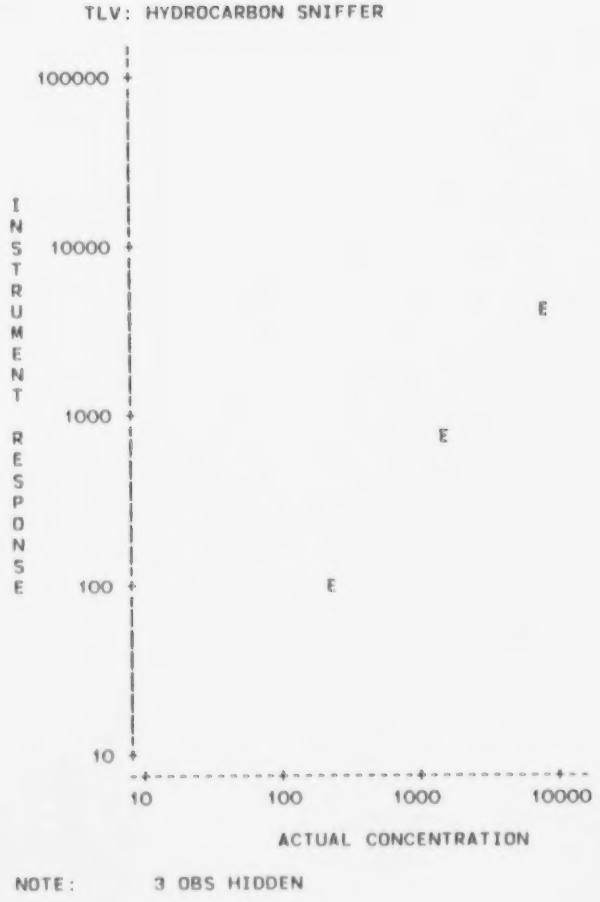


TABLE 5-83

RESPONSE FACTOR SUMMARY

ETHANE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
1000	1083	1083	1083	1.04	0.05	2
3000	3389	3389	3389	1.16	0.05	2
4500	4588	4588	4588	0.57	0.01	2
8000	7857	7857	7857			
		OVERALL MEANS		0.92	0.01	6
		ESTIMATED AT 10,000 PPMV		0.57		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
						0.99		1	1.09		1
						1.11		1	1.21		1
						0.56		1	0.57		1
						0.89	0.17	3	0.96	0.20	3

95 % CONFIDENCE INTERVAL : (0.26, 1.26)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
1000	1083	1083	1083	0.52		1
3000	3389	3389	3389	0.80		1
4500	4588	4588	4588	0.56		1
8000	7857	7857	7857			
		OVERALL MEANS		0.63		3
		ESTIMATED AT 10,000 PPMV		0.73		

RESPONSE FACTORS

TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
			0.52		1						
			0.80		1						
			0.56		1						
			0.63	0.09	3						

95 % CONFIDENCE INTERVAL : (0.21, 2.52)

Figure 5-83

INSTRUMENT RESPONSE VS CONCENTRATION

ETHANE

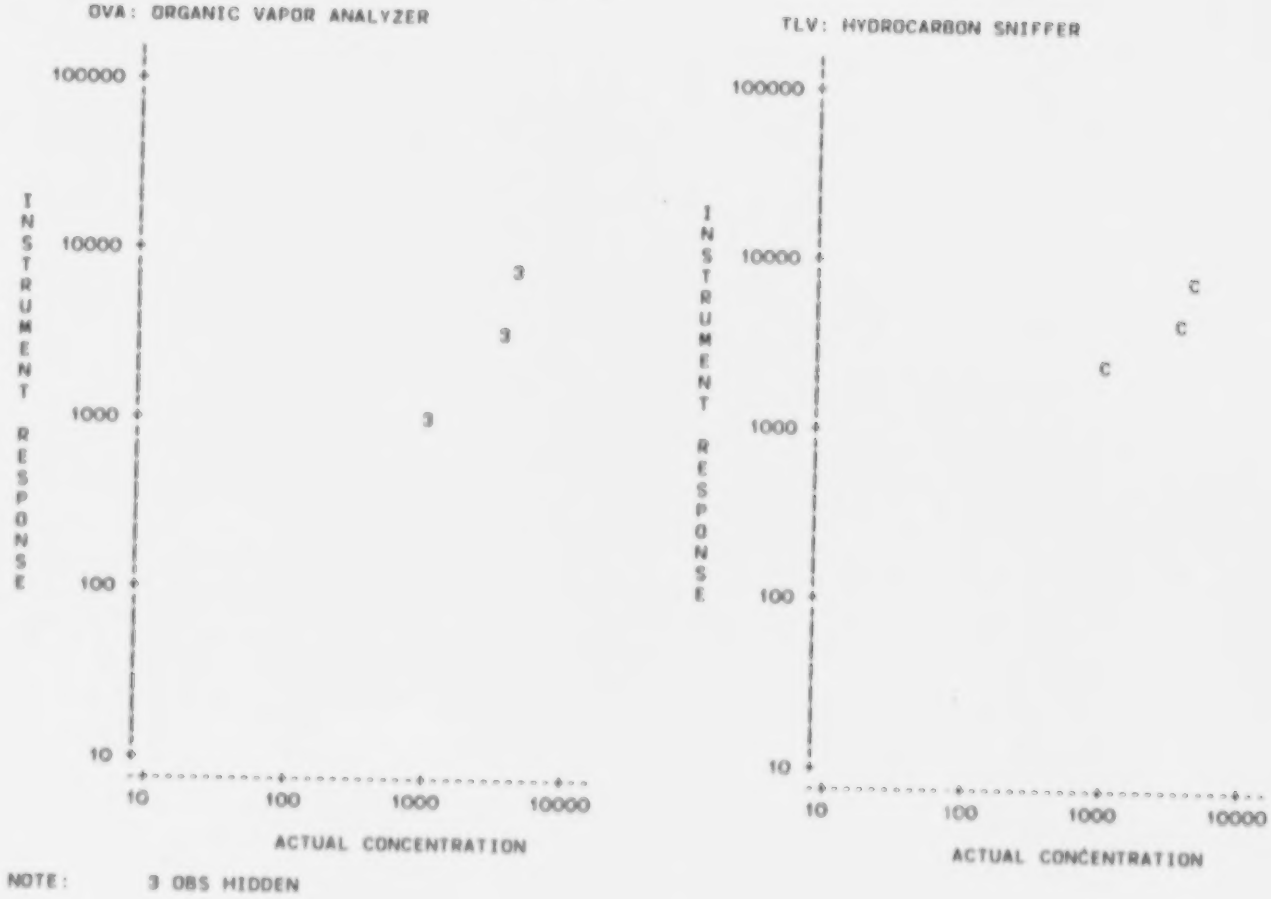


TABLE 5-84

RESPONSE FACTOR SUMMARY

ETHANOL

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	178	178	178	9.45	0.50	2	4.96		1	5.95		1						
1500	1478	1478	1478	3.16	0.02	2	3.15		1	3.18		1						
8000	9019	9019	9019	2.12	0.03	2	2.15		1	2.10		1						
		OVERALL MEANS		3.58	0.03	6	3.42	0.82	3	3.74	1.15	3						

ESTIMATED AT 10,000 PPMV 2.04 95 % CONFIDENCE INTERVAL : (1.83, 2.28)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	178	178	178															
1500	1478	1478	1478															
8000	9019	9019	9019															
		OVERALL MEANS																

ESTIMATED AT 10,000 PPMV 95 % CONFIDENCE INTERVAL : (,)

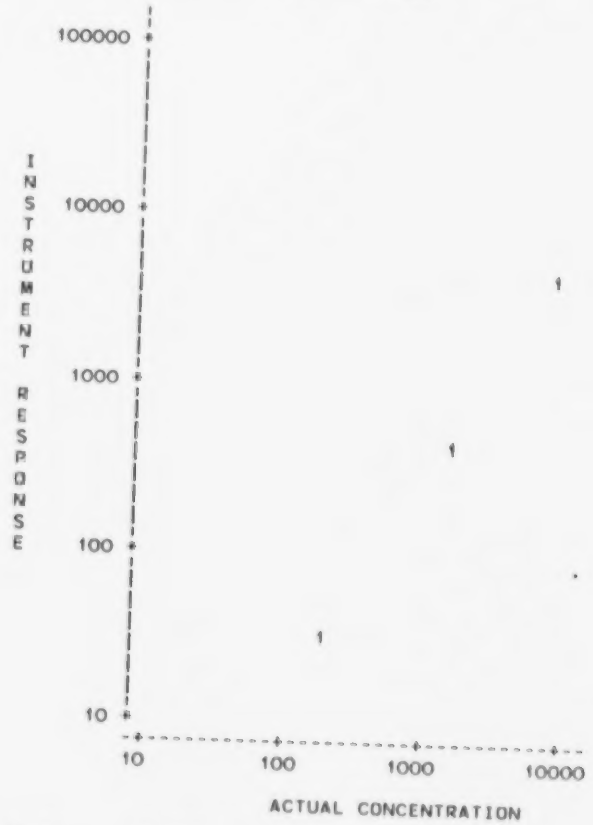
Figure 5-84

INSTRUMENT RESPONSE VS CONCENTRATION

ETHANOL

OVA: ORGANIC VAPOR ANALYZER

TLV: HYDROCARBON SNIFFER



NOTE: 3 OBS HIDDEN

TABLE 5-85

RESPONSE FACTOR SUMMARY

ETHOXY ETHANOL,2-

OVA INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	203	203	203	3.52	0.03	2	3.49		1	3.55		1						
1500	1505	1505	1505	2.70	0.21	2	2.92		1	2.49		1						
4500	4388	4388	4388	1.87	0.04	2	1.91		1	1.83		1						
		OVERALL MEANS		2.70	0.01	6	2.77	0.46	3	2.62	0.50	3						

ESTIMATED AT 10,000 PPMV 1.68 95 % CONFIDENCE INTERVAL : (1.38, 2.06)

TLV INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	203	203	203	0.74		1										0.74		1
1500	1505	1505	1505	1.07		1										1.07		1
4500	4388	4388	4388	1.39		1										1.39		1
		OVERALL MEANS		1.07		3										1.07	0.19	3

ESTIMATED AT 10,000 PPMV 1.61 95 % CONFIDENCE INTERVAL : (1.42, 1.84)

Figure 5-85

INSTRUMENT RESPONSE VS CONCENTRATION

ETHOXY ETHANOL,2-

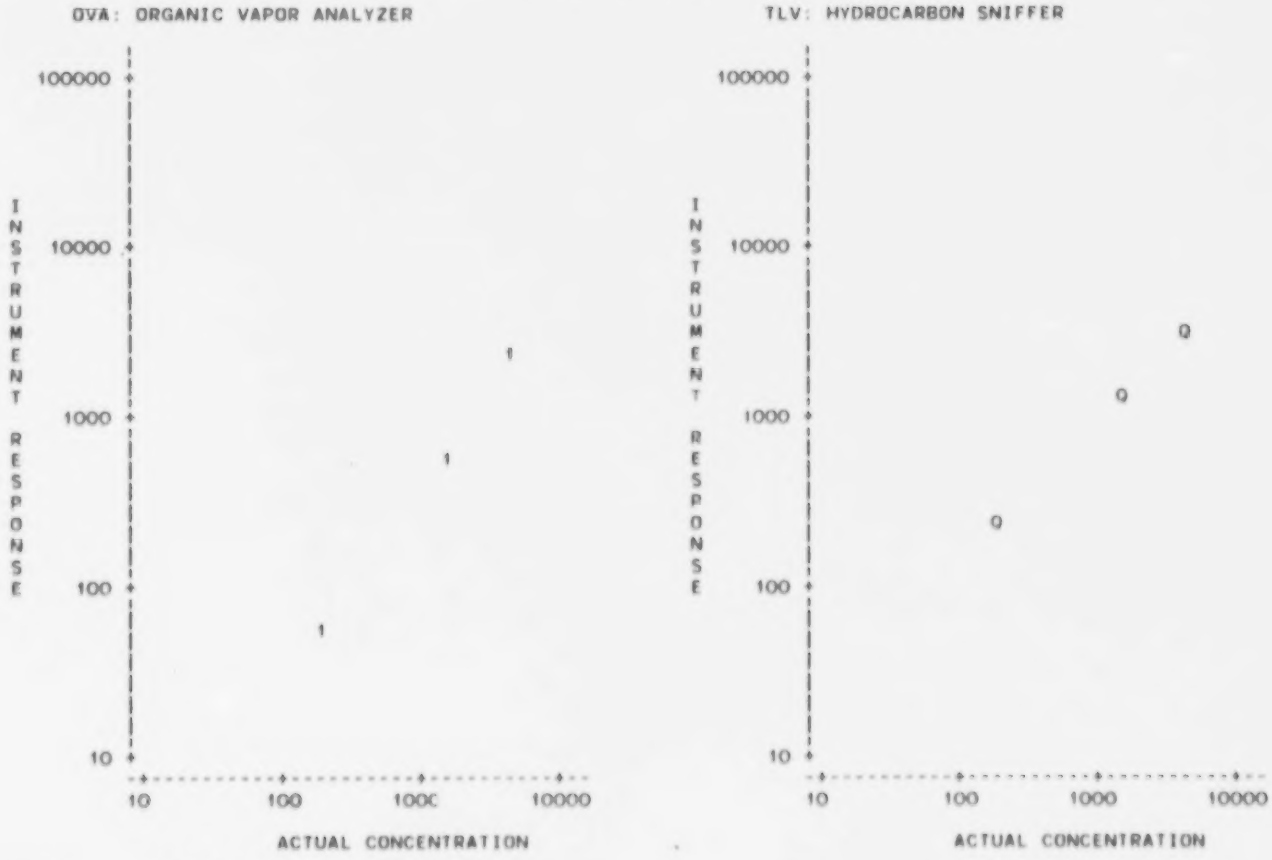


TABLE 5-86

RESPONSE FACTOR SUMMARY

ETHYL ACETATE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	52	60	56	1.76	0.21	4	1.55	0.18	2	1.97	0.11	2						
200	223	223	223	1.66	0.08	2	1.58		1	1.74		1						
500	538	542	540	1.36	0.02	4	1.34	0.22	2	1.38	0.01	2						
1500	1407	1407	1407	1.26	0.14	2	1.12		1	1.40		1						
8000	7923	8793	8490	0.85	0.03	6	0.88	0.12	3	0.82	0.04	3						
		OVERALL MEANS		1.30	0.00	18	1.24	0.12	9	1.36	0.16	9						

ESTIMATED AT 10,000 PPMV 0.84 95 % CONFIDENCE INTERVAL : (0.74, 0.94)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
50	52	60	56	0.82	0.04	4	0.86	0.40	2	0.78	0.42	2						
200	223	223	223	1.05	0.09	2	1.14		1	0.96		1						
500	538	542	540	1.19	0.07	4	1.26	0.06	2	1.12	0.11	2						
1500	1407	1407	1407	1.33	0.05	2	1.38		1	1.29		1						
8000	7923	8793	8490	1.30	0.05	6	1.35	0.02	3	1.24	0.01	3						
		OVERALL MEANS		1.14	0.00	18	1.20	0.10	9	1.09	0.10	9						

ESTIMATED AT 10,000 PPMV 1.37 95 % CONFIDENCE INTERVAL : (1.08, 1.74)

Figure 5-86

INSTRUMENT RESPONSE VS CONCENTRATION

ETHYL ACETATE

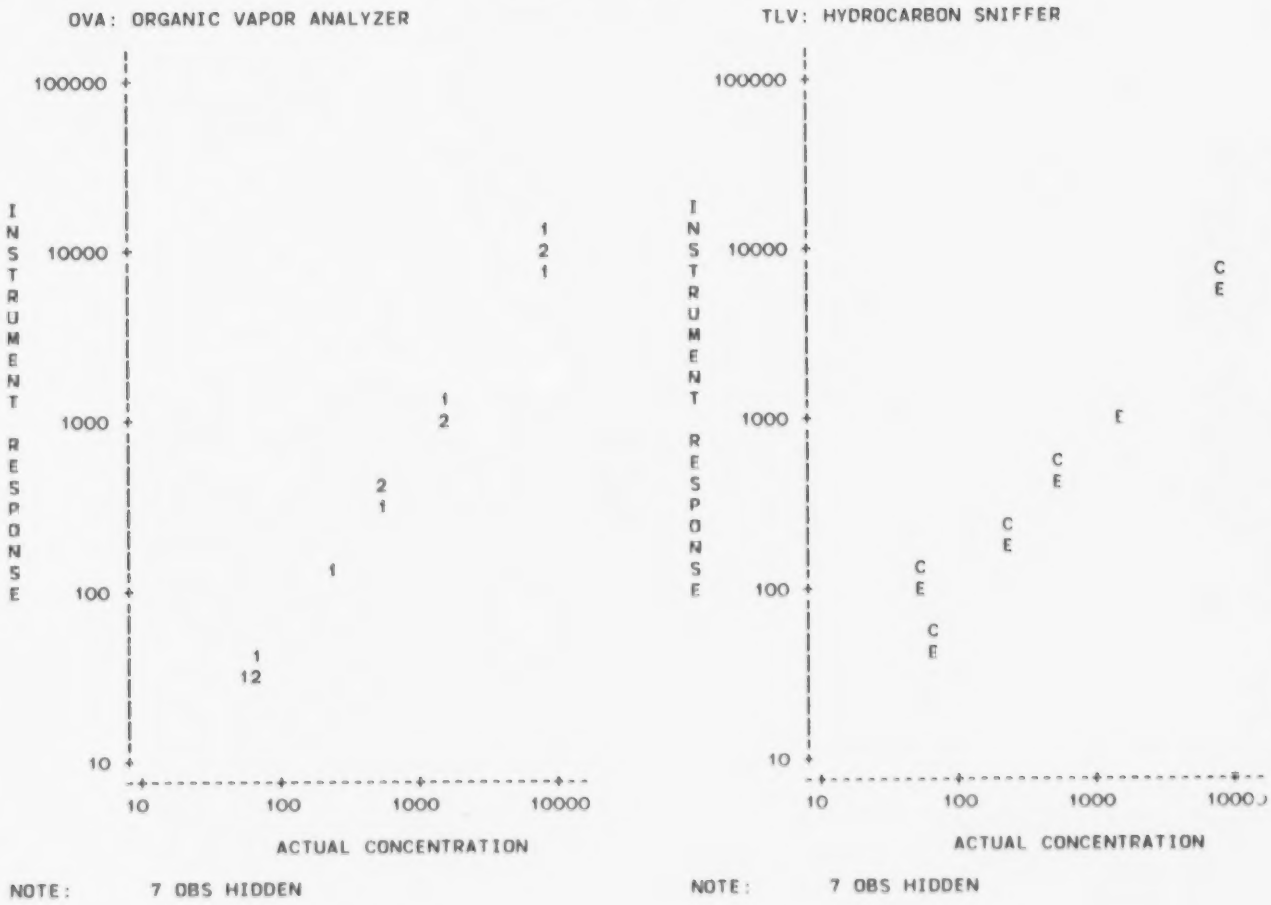


TABLE 5-87

RESPONSE FACTOR SUMMARY

ETHYL ACETOACETATE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	189	189	189	1.56	0.16	2	1.40		1	1.72		1						
700	713	713	713	1.79	0.11	2	1.68		1	1.90		1						
1200	1166	1166	1166	2.20	0.06	2	2.14		1	2.26		1						
		OVERALL MEANS		1.85	0.02	6	1.74	0.22	3	1.96	0.16	3						

ESTIMATED AT 10,000 PPMV 3.02 95 % CONFIDENCE INTERVAL : (1.98, 4.62)

TLV INSTRUMENTS

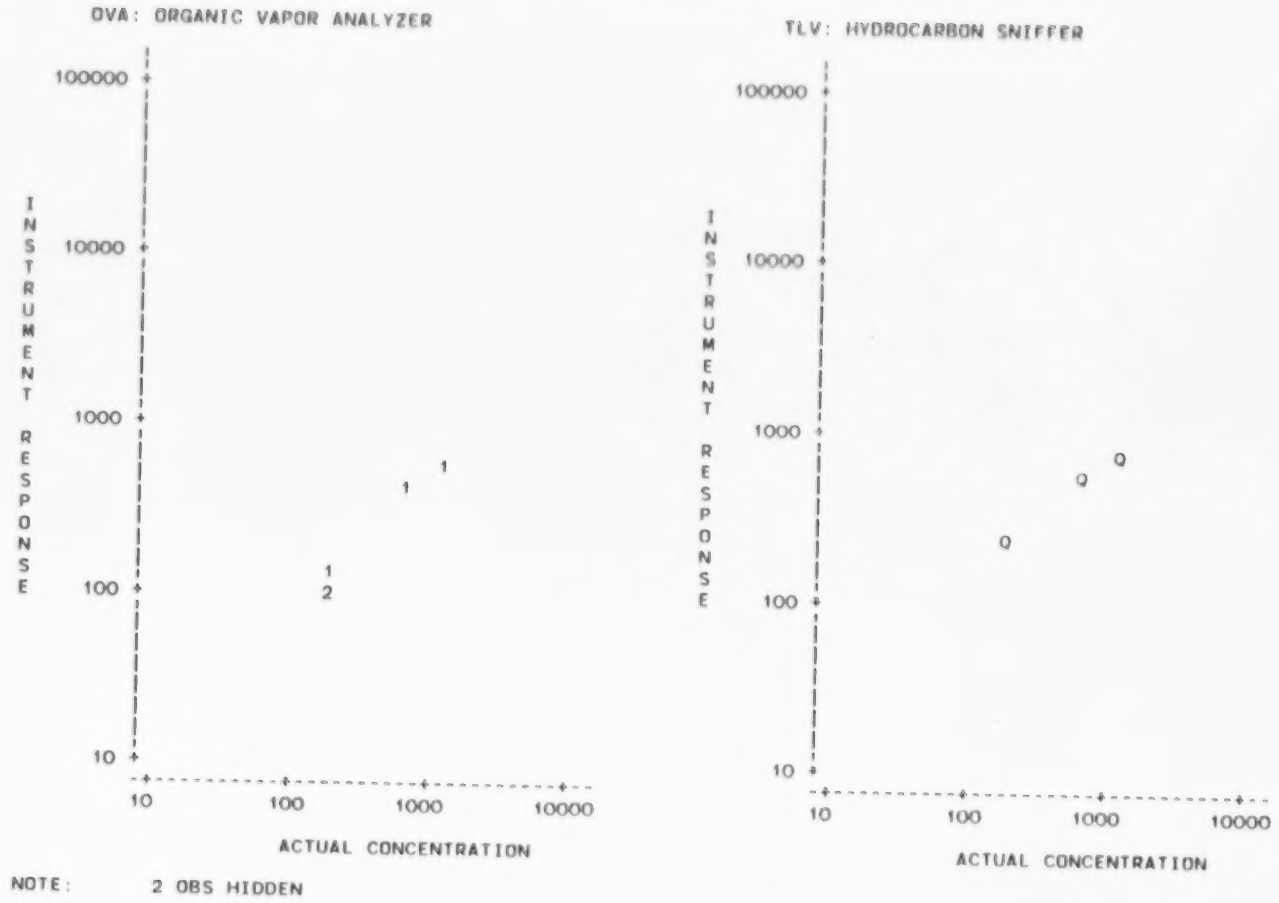
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	189	189	189	0.82		1										0.82		1
700	713	713	713	1.31		1										1.31		1
1200	1166	1166	1166	1.50		1										1.50		1
		OVERALL MEANS		1.21		3										1.21	0.20	3

ESTIMATED AT 10,000 PPMV 3.13 95 % CONFIDENCE INTERVAL : (2.71, 3.63)

Figure 5-87

INSTRUMENT RESPONSE VS CONCENTRATION

ETHYL ACETOACETATE



NOTE: 2 OBS HIDDEN

TABLE 5-88

RESPONSE FACTOR SUMMARY

ETHYL ACRYLATE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	213	213	213	1.88	0.00	2	1.88		1	1.88		1						
1500	1495	1495	1495	1.41	0.10	2	1.51		1	1.31		1						
6000	6354	6354	6354	0.75	0.00	2	0.75		1	0.75		1						
8000	7937	7937	7937															
OVERALL MEANS				1.35	0.01	6	1.38	0.33	3	1.31	0.33	3						

ESTIMATED AT 10,000 PPMV 0.72 95 % CONFIDENCE INTERVAL : (0.55, 0.93)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	213	213	213															
1500	1495	1495	1495															
6000	6354	6354	6354															
8000	7937	7937	7937															
OVERALL MEANS																		

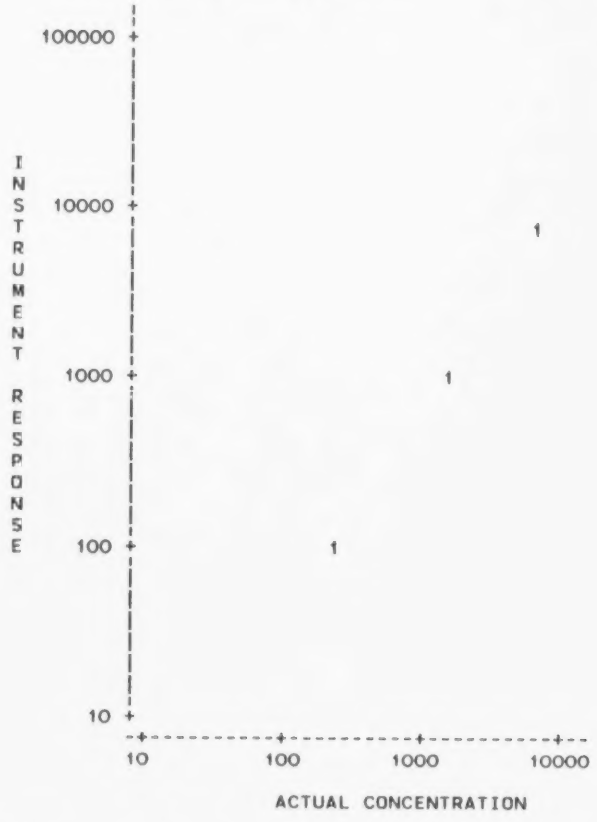
ESTIMATED AT 10,000 PPMV 95 % CONFIDENCE INTERVAL : (,)

Figure 5-88

INSTRUMENT RESPONSE VS CONCENTRATION

ETHYL ACRYLATE

OVA: ORGANIC VAPOR ANALYZER TLV: HYDROCARBON SNIFFER



NOTE: 3 OBS HIDDEN

TABLE 5-89

RESPONSE FACTOR SUMMARY

ETHYL CHLOROACETATE

OVA INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	215	215	215	1.94	0.14	2	1.80		1	2.08		1						
1500	1525	1525	1525	1.90	0.01	2	1.89		1	1.92		1						
4200	3981	3981	3981	1.99	0.00	2	1.99		1	1.99		1						
		OVERALL MEANS		1.94	0.01	6	1.89	0.06	3	2.00	0.05	3						

ESTIMATED AT 10,000 PPMV 1.97 95 % CONFIDENCE INTERVAL : (1.76, 2.21)

TLV INSTRUMENTS

R E S P O N S E F A C T O R S

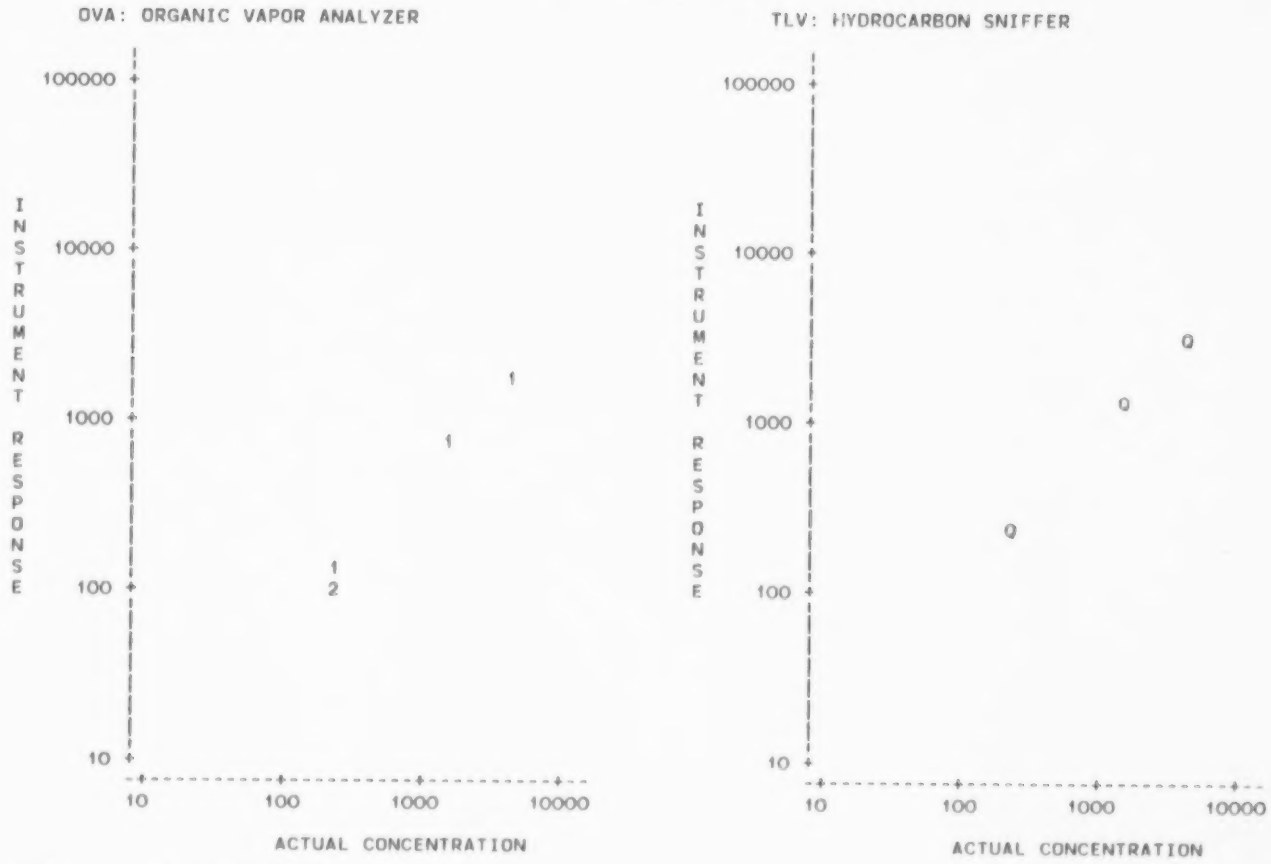
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	215	215	215	0.82		1										0.82		1
1500	1525	1525	1525	1.00		1										1.00		1
4200	3981	3981	3981	1.35		1										1.35		1
		OVERALL MEANS		1.06		3										1.06	0.16	3

ESTIMATED AT 10,000 PPMV 1.47 95 % CONFIDENCE INTERVAL : (0.97, 2.23)

Figure 5-89

INSTRUMENT RESPONSE VS CONCENTRATION

ETHYL CHLOROACETATE



NOTE: 2 OBS HIDDEN

TABLE 5-90

RESPONSE FACTOR SUMMARY

ETHYL ETHER

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	206	206	206	2.02	0.02	2	1.99		1	2.04		1						
1500	1497	1497	1497	1.72	0.03	2	1.76		1	1.69		1						
6000	6148	6148	6148	0.98	0.03	2	1.01		1	0.95		1						
8000	8390	8390	8390															
		OVERALL MEANS		1.57	0.00	6	1.59	0.30	3	1.56	0.32	3						

ESTIMATED AT 10,000 PPMV 0.97 95 % CONFIDENCE INTERVAL : (0.73, 1.28)

TLV INSTRUMENTS

RESPONSE FACTORS

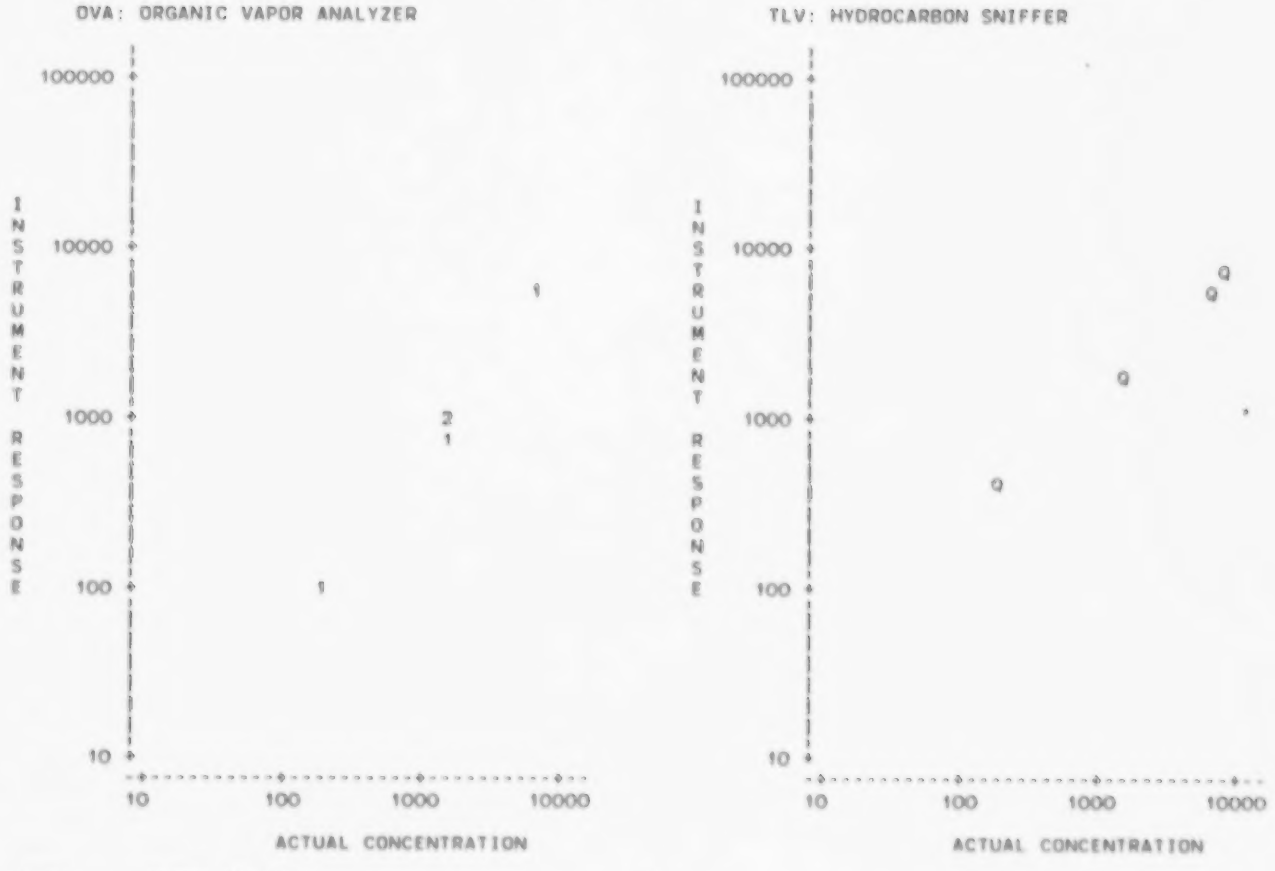
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	206	206	206	0.55		1										0.55		1
1500	1497	1497	1497	0.75		1										0.75		1
6000	6148	6148	6148	1.06		1										1.06		1
8000	8390	8390	8390	1.07		1										1.07		1
		OVERALL MEANS		0.86		4										0.86	0.13	4

ESTIMATED AT 10,000 PPMV 1.11 95 % CONFIDENCE INTERVAL : (1.01, 1.23)

Figure 5-90

INSTRUMENT RESPONSE VS CONCENTRATION

ETHYL ETHER



NOTE: 2 OBS HIDDEN

TABLE 5-91

RESPONSE FACTOR SUMMARY

ETHYLBENZENE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	50	60	55	2.01	0.20	4	1.82	0.19	2	2.21	0.02	2						
200	201	201	201	0.67	0.01	2	0.66		1	0.68		1						
500	556	562	559	2.09	0.02	4	2.07	0.08	2	2.11	0.03	2						
1500	1492	1492	1492	0.52	0.00	2	0.52		1	0.52		1						
3000	3254	3254	3254	0.35	0.01	2	0.34		1	0.36		1						
4000	4024	4906	4465	1.28	0.02	2	1.26		1	1.29		1						
8000	7439	8848	8329	1.23	0.06	4	1.28	0.13	2	1.17	0.27	2						
			OVERALL MEANS	1.35	0.00	20	1.31	0.21	10	1.38	0.24	10						

ESTIMATED AT 10,000 PPMV 0.70 95 % CONFIDENCE INTERVAL : (0.45, 1.09)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
50	50	60	55	1.55	0.38	4	1.93	0.01	2	1.16	0.03	2						
200	201	201	201	0.80		1										0.80		1
500	556	562	559	6.56	3.94	4	10.50	0.32	2	2.62	0.12	2						
1500	1492	1492	1492	0.92		1										0.92		1
3000	3254	3254	3254	1.41		1										1.41		1
4000	4024	4906	4465	12.69	10	3	32.62		1	4.11		1				1.32		1
8000	7439	8848	8329	12.28	8.56	5	27.09	1.20	2	3.05	0.31	2				1.14		1
			OVERALL MEANS	7.11	0.18	19	15.95	4.84	7	2.54	0.41	7				1.12	0.12	5

ESTIMATED AT 10,000 PPMV 3.14 95 % CONFIDENCE INTERVAL : (1.43, 6.92)

Figure 5-91

INSTRUMENT RESPONSE VS CONCENTRATION

ETHYLBENZENE

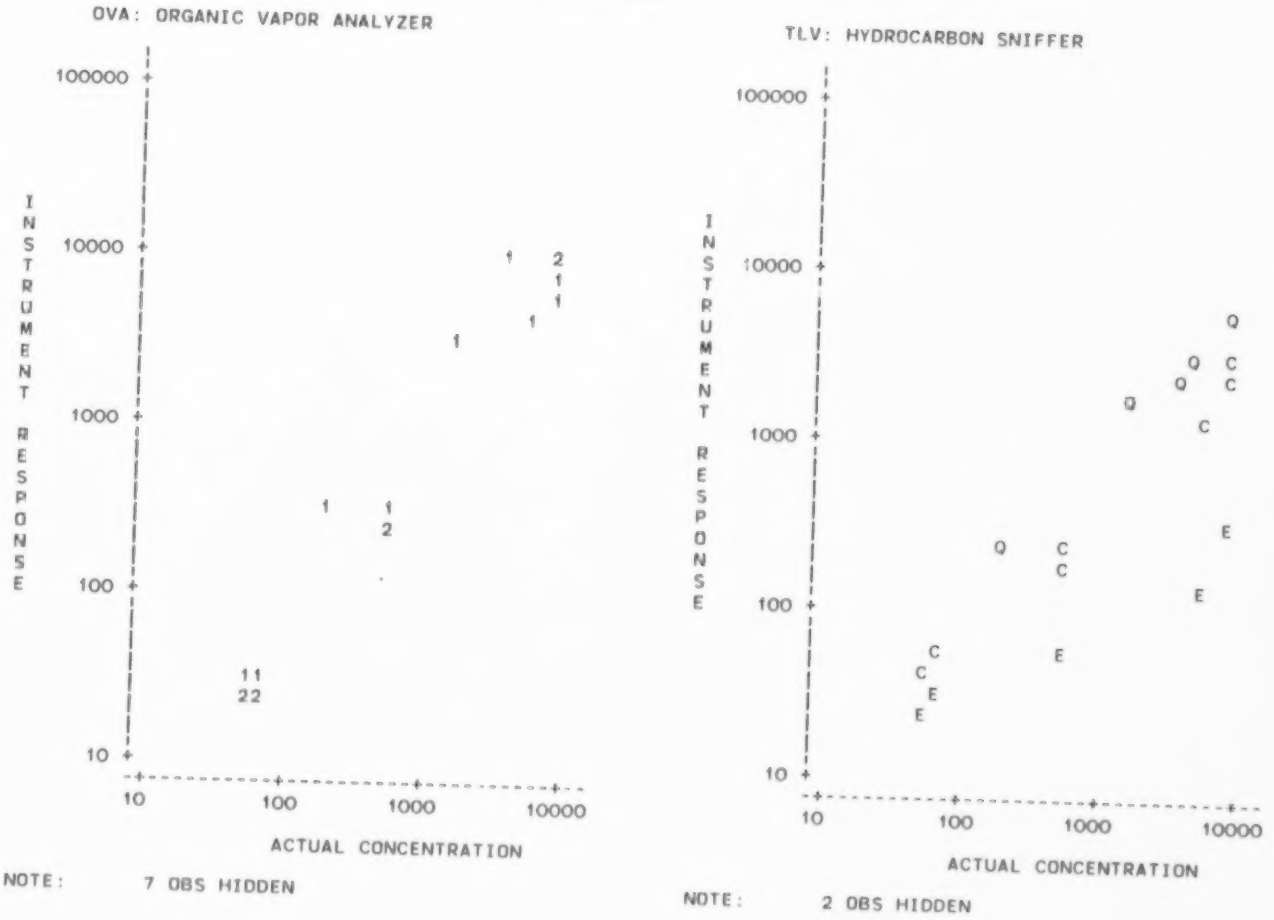


TABLE 5-92

RESPONSE FACTOR SUMMARY

ETHYLENE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1000	989	989	989	4.79	0.23	2	5.02		1	4.56		1						
4000	4482	4482	4482	0.94	0.01	2	0.95		1	0.93		1						
6000	6220	6220	6220	0.94	0.02	2	0.96		1	0.92		1						
8000	8411	8411	8411															
20E3	20E3	20E3	20E3															
	OVERALL MEANS			2.22	0.01	6	2.31	1.36	3	2.14	1.21	3						

ESTIMATED AT 10,000 PPMV 0.52 95 % CONFIDENCE INTERVAL : (0.39, 0.68)

TLV INSTRUMENTS

RESPONSE FACTORS

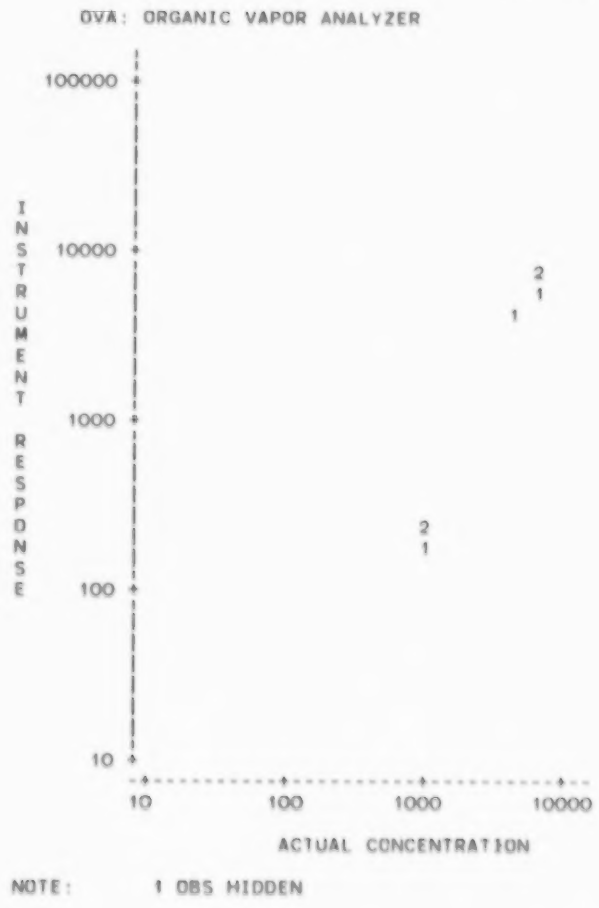
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
1000	989	989	989	1.35		1										1.35		1
4000	4482	4482	4482	1.15		1										1.15		1
6000	6220	6220	6220	1.35		1										1.35		1
8000	8411	8411	8411	1.34		1										1.34		1
20E3	20E3	20E3	20E3	1.79	0.03	2							1.82		1	1.76		1
	OVERALL MEANS			1.46	0.03	6							1.82		1	1.39	0.10	5

ESTIMATED AT 10,000 PPMV 1.49 95 % CONFIDENCE INTERVAL : (1.27, 1.74)

Figure 5-92

INSTRUMENT RESPONSE VS CONCENTRATION

ETHYLENE



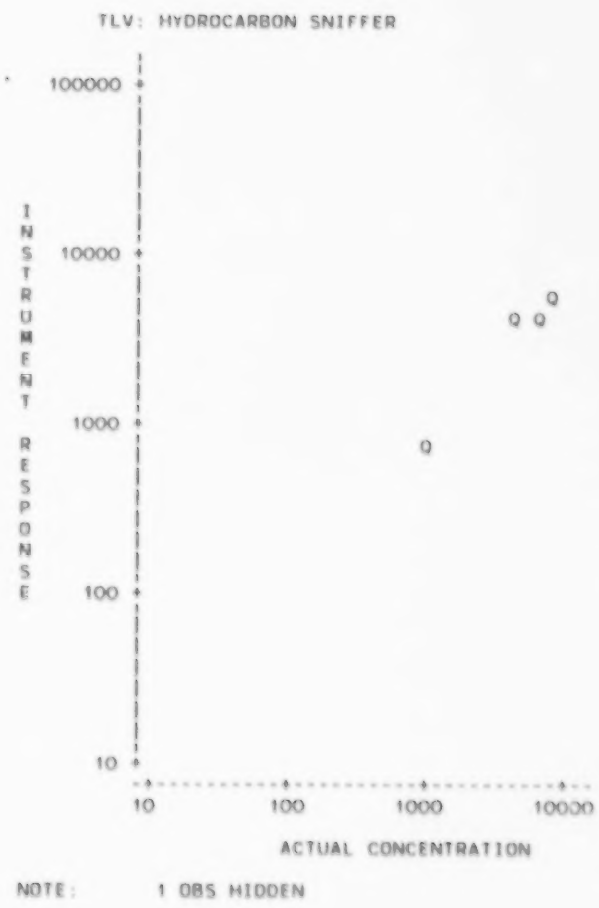


TABLE 5-93

RESPONSE FACTOR SUMMARY

ETHYLENE OXIDE

OVA INSTRUMENTS — R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1000	998	998	998	3.43	0.33	2							3.10		1	3.75		1
4500	4444	4444	4444	3.25	0.05	2							3.19		1	3.30		1
8000	8430	8430	8430	2.62	0.02	2							2.64		1	2.60		1
		OVERALL MEANS		3.10	0.02	6							2.98	0.17	3	3.22	0.34	3

ESTIMATED AT 10,000 PPMV 2.72 — 95 % CONFIDENCE INTERVAL : (2.31, 3.20)

TLV INSTRUMENTS — R E S P O N S E F A C T O R S

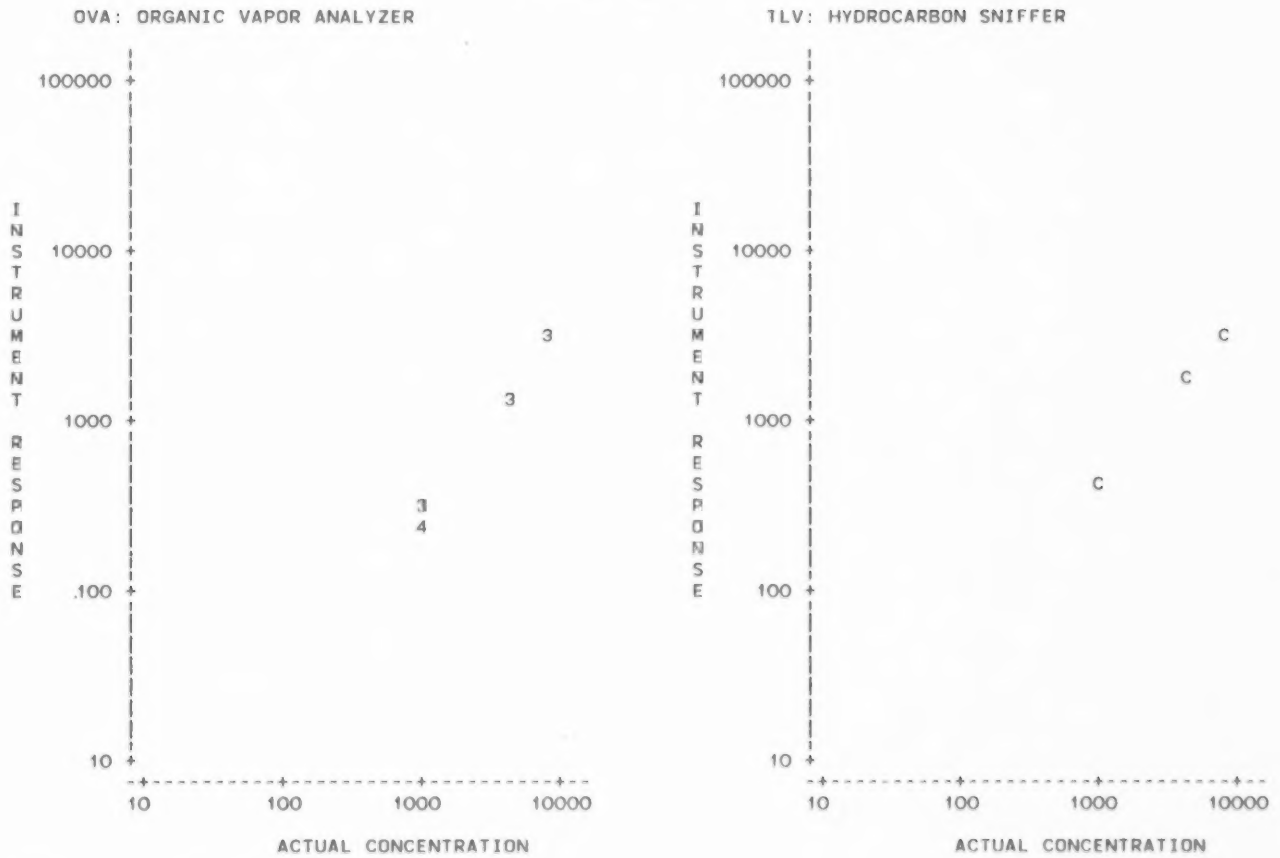
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
1000	998	998	998	2.56		1				2.56		1						
4500	4444	4444	4444	2.31		1				2.31		1						
8000	8430	8430	8430	2.55		1				2.55		1						
		OVERALL MEANS		2.47		3				2.47	0.08	3						

ESTIMATED AT 10,000 PPMV 2.43 — 95 % CONFIDENCE INTERVAL : (1.92, 3.07)

Figure 5-93

INSTRUMENT RESPONSE VS CONCENTRATION

ETHYLENE OXIDE



NOTE: 2 OBS HIDDEN

TABLE 5-94

RESPONSE FACTOR SUMMARY

ETHYLENEDIAMINE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	224	224	224	2.31	0.07	2	2.24		1	2.39		1						
1500	1548	1548	1548	1.67	0.03	2	1.64		1	1.69		1						
8000	7636	7636	7636	1.99	0.08	2	1.91		1	2.07		1						
		OVERALL MEANS		1.99	0.01	6	1.93	0.17	3	2.05	0.20	3						

ESTIMATED AT 10,000 PPMV 1.78 95 % CONFIDENCE INTERVAL : (1.39, 2.28)

TLV INSTRUMENTS

RESPONSE FACTORS

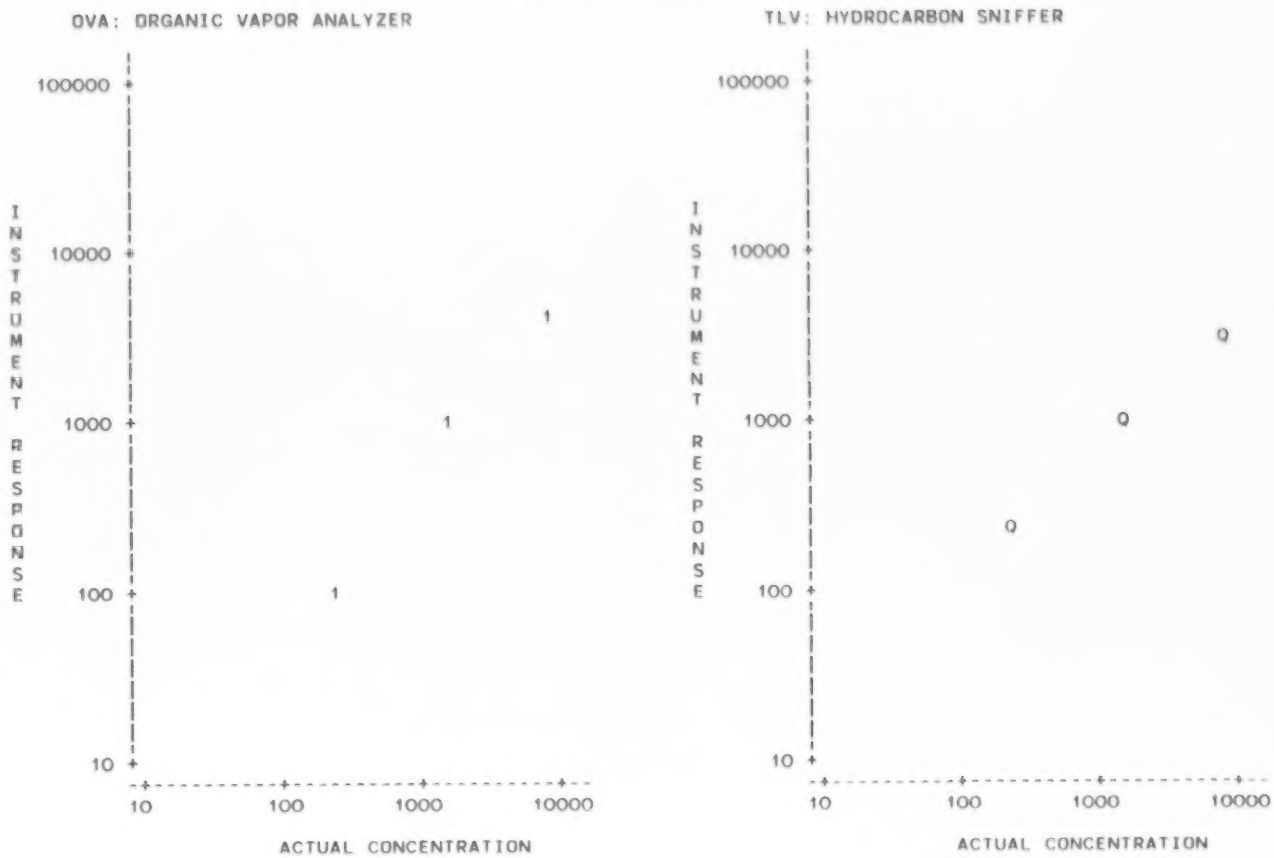
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	224	224	224	1.05		1										1.05		1
1500	1548	1548	1548	1.47		1										1.47		1
8000	7636	7636	7636	2.42		1										2.42		1
		OVERALL MEANS		1.65		3										1.65	0.41	3

ESTIMATED AT 10,000 PPMV 2.46 95 % CONFIDENCE INTERVAL : (1.83, 3.32)

Figure 5-94

INSTRUMENT RESPONSE VS CONCENTRATION

ETHYLENEDIAMINE



NOTE: 3 OBS HIDDEN

TABLE 5-95

RESPONSE FACTOR SUMMARY

FORMIC ACID

OVA INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL	ACTUAL PPMV			OVERALL			OVA METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	242	242	242	120.9	0.00	2	120.9		1	120.9		1						
1500	1440	1440	1440	71.32	8.70	2	62.62		1	80.02		1						
8000	7831	7831	7831	37.30	2.65	2	34.65		1	39.96		1						
		OVERALL MEANS		76.52	0.63	6	72.73	25.4	3	80.30	23.4	3						

ESTIMATED AT 10,000 PPMV 34.87 95 % CONFIDENCE INTERVAL : (29.00,41.94)

TLV INSTRUMENTS

R E S P O N S E F A C T O R S

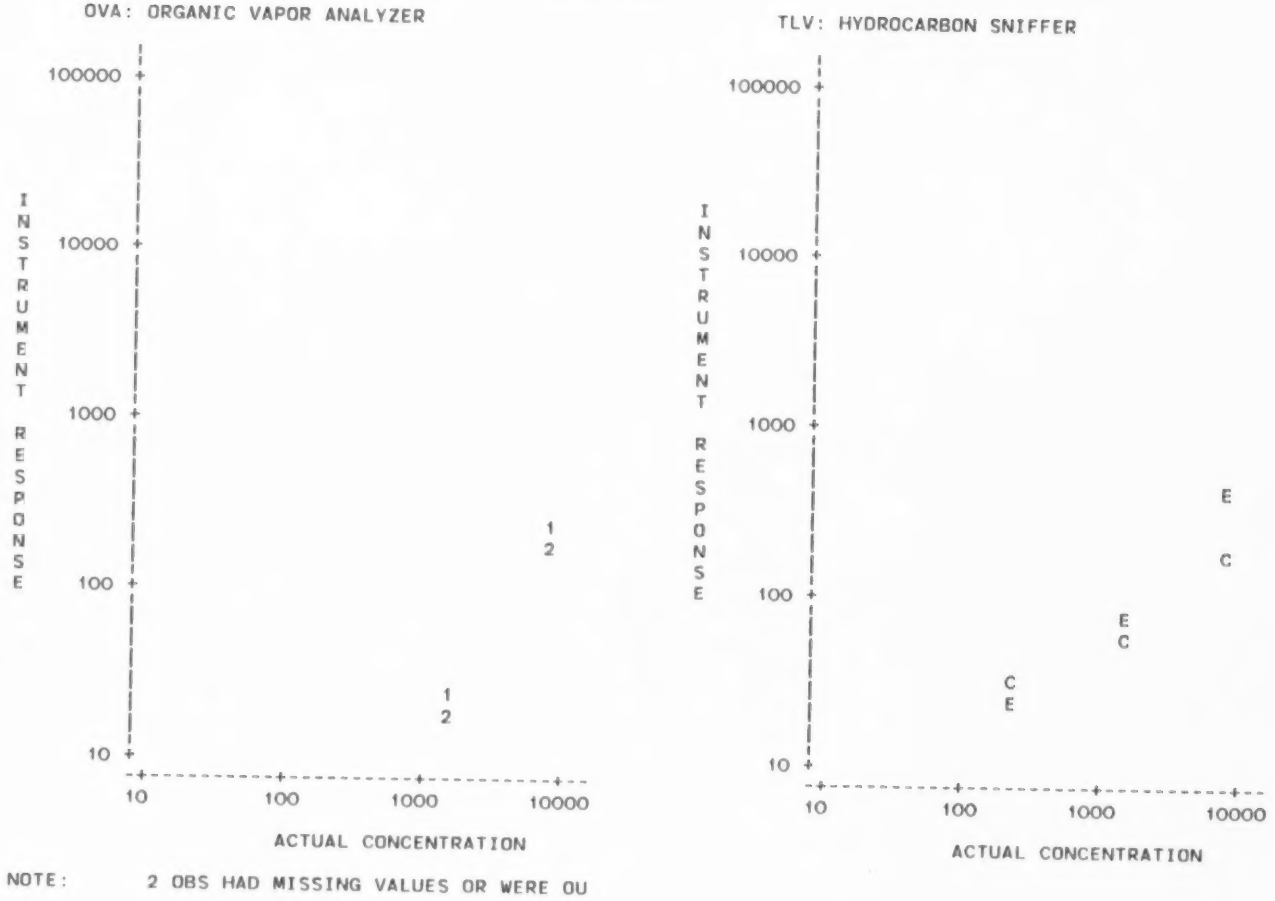
NOMINAL	ACTUAL PPMV			OVERALL			TLV METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	242	242	242	8.84	2.21	2	11.06		1	6.63		1						
1500	1440	1440	1440	22.65	5.09	2	17.56		1	27.75		1						
8000	7831	7831	7831	31.70	11.2	2	20.46		1	42.94		1						
		OVERALL MEANS		21.07	0.78	6	16.36	2.78	3	25.77	10.5	3						

ESTIMATED AT 10,000 PPMV 33.21 95 % CONFIDENCE INTERVAL : (16.78,65.73)

Figure 5-95

INSTRUMENT RESPONSE VS CONCENTRATION

FORMIC ACID



NOTE: 2 OBS HAD MISSING VALUES OR WERE OU

TABLE 5-96

RESPONSE FACTOR SUMMARY

FREON 12

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
500	530	530	530	3.06	0.00	2	3.06		1	3.06		1						
1500	1577	1577	1577	4.95	0.76	2	5.71		1	4.19		1						
8000	7495	7495	7495	8.82	1.65	2	10.47		1	7.17		1						
			OVERALL MEANS	5.61	0.13	6	6.42	2.17	3	4.81	1.22	3						

ESTIMATED AT 10,000 PPMV 9.65 95 % CONFIDENCE INTERVAL : (6.99,13.33)

TLV INSTRUMENTS

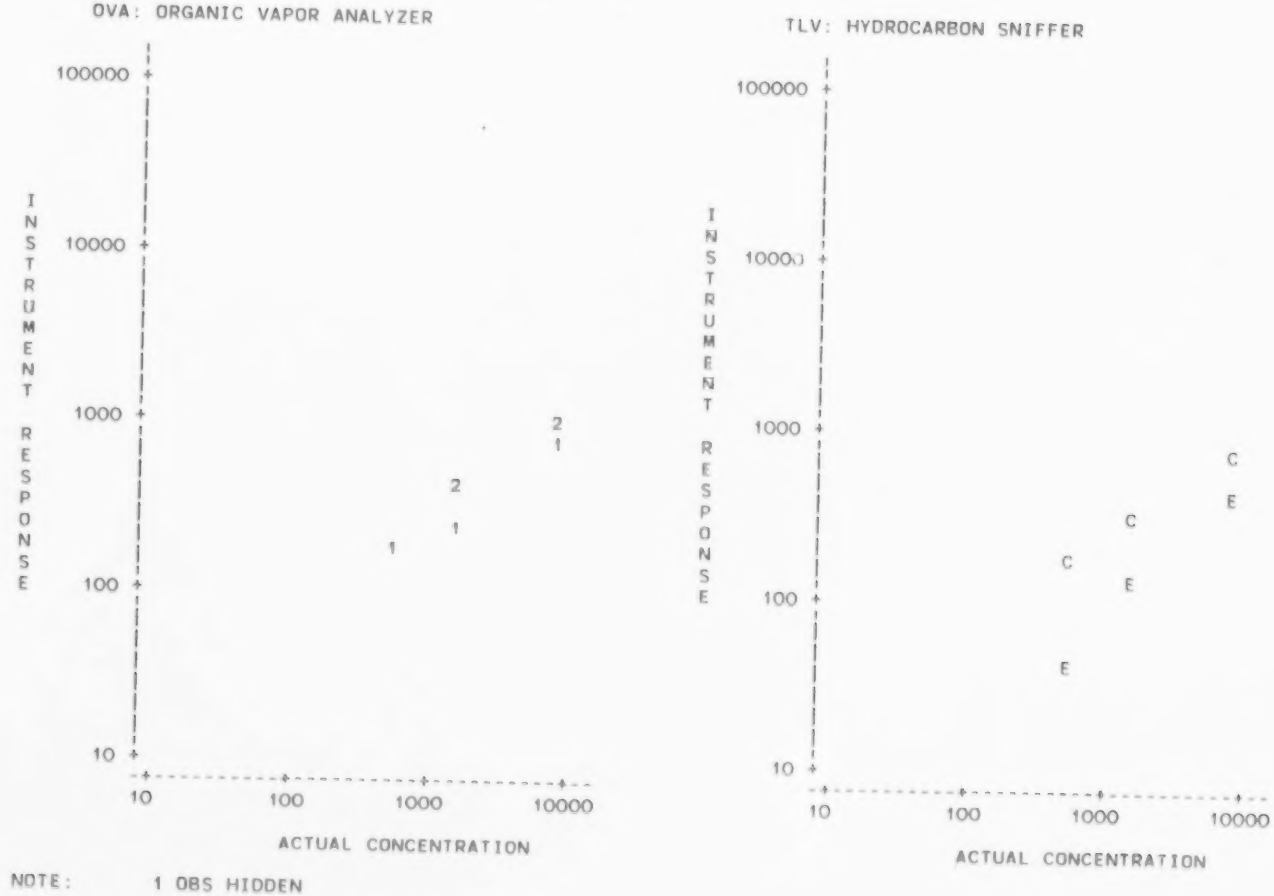
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
500	530	530	530	8.14	5.23	2	13.37		1	2.91		1						
1500	1577	1577	1577	8.69	3.46	2	12.14		1	5.23		1						
8000	7495	7495	7495	13.96	3.17	2	17.13		1	10.79		1						
			OVERALL MEANS	10.26	0.66	6	14.22	1.50	3	6.31	2.34	3						

ESTIMATED AT 10,000 PPMV 11.83 95 % CONFIDENCE INTERVAL : (3.63,38.59)

Figure 5-96

INSTRUMENT RESPONSE VS CONCENTRATION

FREON 12



NOTE: 1 OBS HIDDEN

TABLE 5-97

RESPONSE FACTOR SUMMARY

FURFURAL

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	218	218	218	2.93	0.02	2	2.95		1	2.91		1						
1500	1503	1503	1503	2.72	0.24	2	2.97		1	2.48		1						
8000	7662	7662	7662	10.63	0.38	2	10.26		1	11.01		1						
		OVERALL MEANS		5.43	0.01	6	5.39	2.43	3	5.47	2.77	3						

ESTIMATED AT 10,000 PPMV 7.96 95 % CONFIDENCE INTERVAL : (3.69,17.15)

TLV INSTRUMENTS

RESPONSE FACTORS

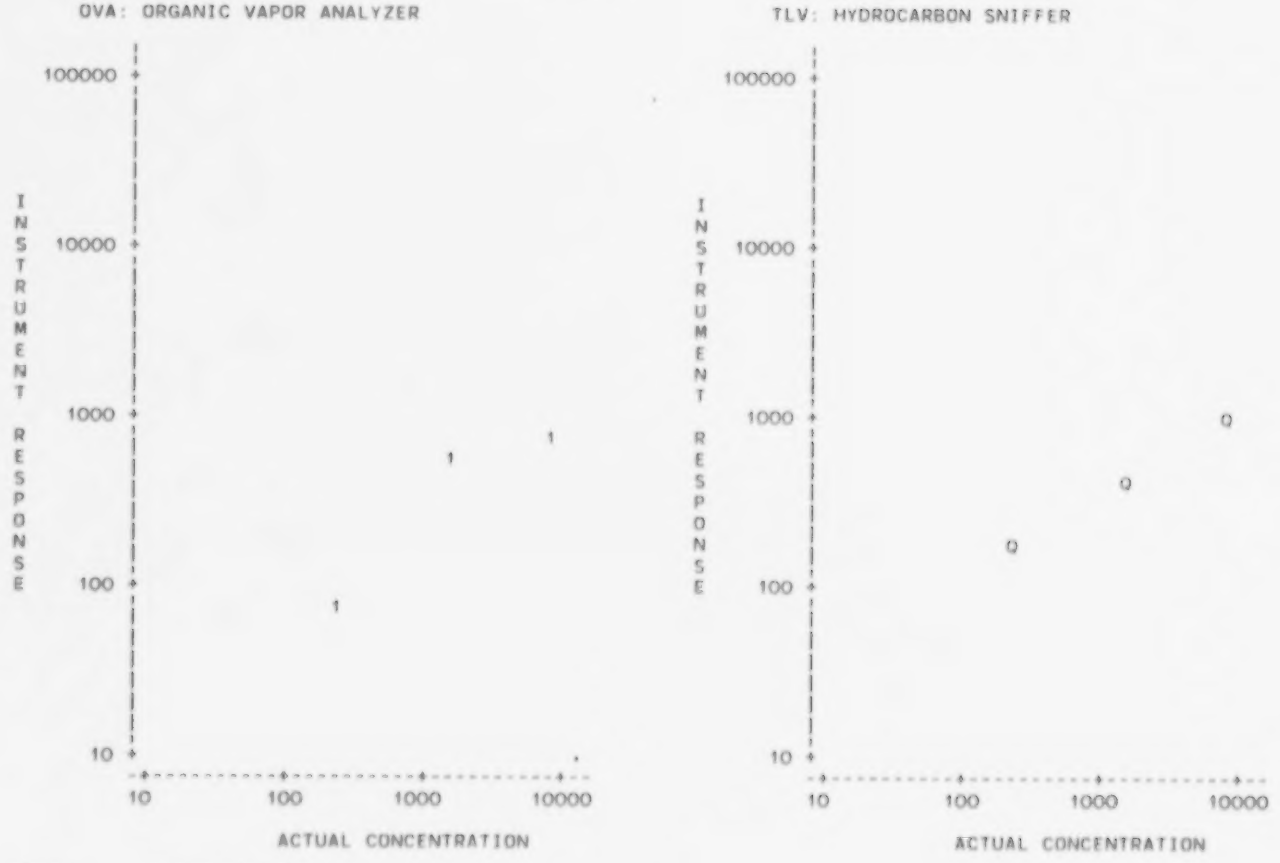
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	218	218	218	1.37		1										1.37		1
1500	1503	1503	1503	3.77		1										3.77		1
8000	7662	7662	7662	8.69		1										8.69		1
		OVERALL MEANS		4.61		3										4.61	2.15	3

ESTIMATED AT 10,000 PPMV 10.01 95 % CONFIDENCE INTERVAL : (9.72,10.31)

Figure 5-97

INSTRUMENT RESPONSE VS CONCENTRATION

FURFURAL



NOTE: 3 OBS HIDDEN

TABLE 5-98

RESPONSE FACTOR SUMMARY

GLYCIDOL

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2284	SE	N	2159	SE	N	1813	SE	N
200	238	238	238	12.63	2.27	2	10.37		1	14.90		1						
1000	994	994	994	11.58	1.19	2	10.35		1	12.74		1						
2040	2044	2044	2044	9.76	0.72	2	9.09		1	10.48		1						
OVERALL MEANS				11.32	0.23	6	9.92	0.44	3	12.71	1.28	3						

ESTIMATED AT 10,000 PPMV 8.42

95 % CONFIDENCE INTERVAL : (5.14,13.81)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	238	238	238	4.70	0.75	2	5.45		1	3.95		1						
1000	994	994	994	4.56	0.83	2	5.39		1	3.73		1						
2040	2044	2044	2044	5.32	0.91	2	6.23		1	4.42		1						
OVERALL MEANS				4.86	0.14	6	5.69	0.27	3	4.03	0.20	3						

ESTIMATED AT 10,000 PPMV 5.23

95 % CONFIDENCE INTERVAL : (2.68,10.22)

Figure 5-98

INSTRUMENT RESPONSE VS CONCENTRATION

GLYCIDOL

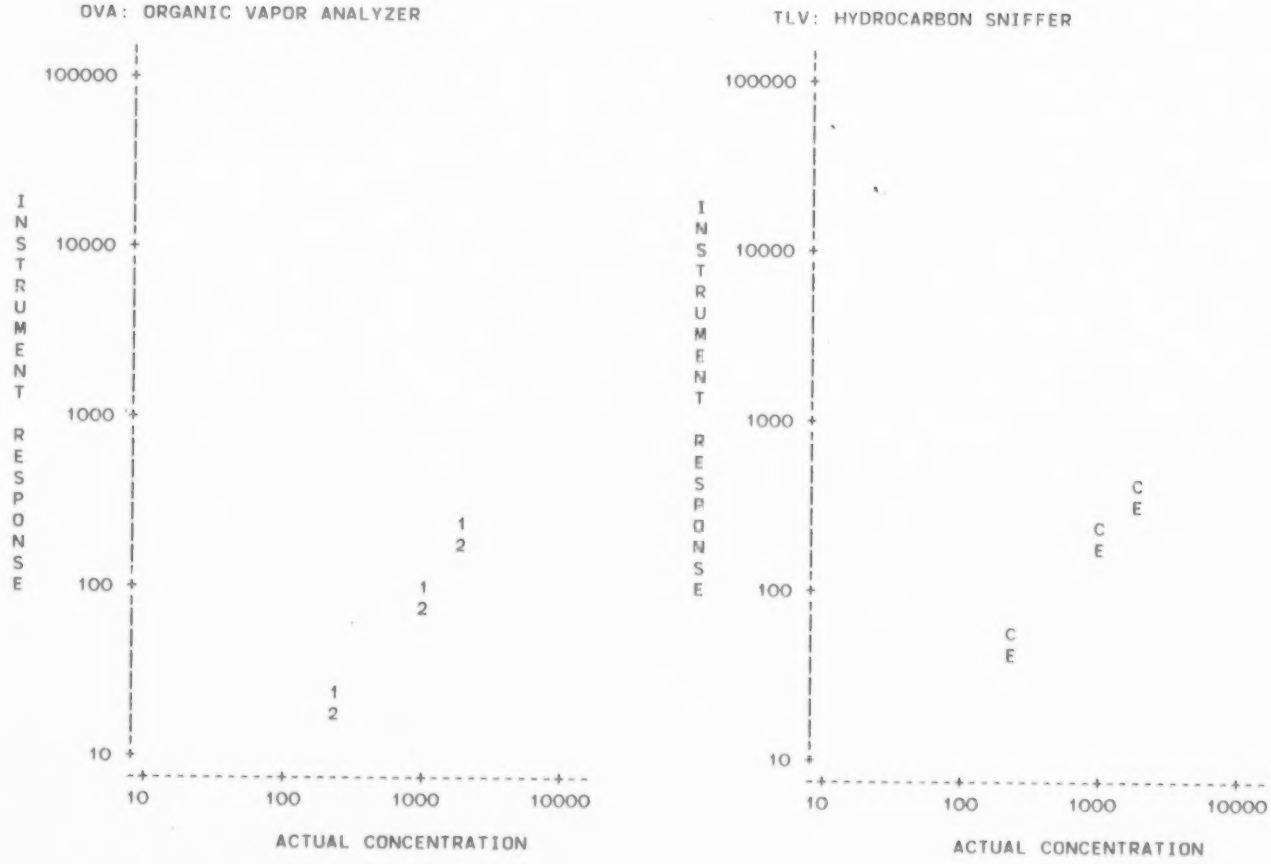


TABLE 5-99

RESPONSE FACTOR SUMMARY

HEPTANE

OVA INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	234	234	234	1.00		1							1.00		1			
1500	1602	1602	1602	0.67		1							0.67		1			
4000	3319	3319	3319	0.39		1							0.39		1			
8000	8588	8588	8588															
		OVERALL MEANS		0.69		3							0.69	0.18	3			

ESTIMATED AT 10,000 PPMV 0.30 95 % CONFIDENCE INTERVAL : (0.12, 0.75)

TLV INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	234	234	234	0.57		1				0.57		1						
1500	1602	1602	1602	0.62		1				0.62		1						
4000	3319	3319	3319	0.72		1				0.72		1						
8000	8588	8588	8588															
		OVERALL MEANS		0.64		3				0.64	0.04	3						

ESTIMATED AT 10,000 PPMV 0.75 95 % CONFIDENCE INTERVAL : (0.56, 1.00)

Figure 5-99

INSTRUMENT RESPONSE VS CONCENTRATION

HEPTANE

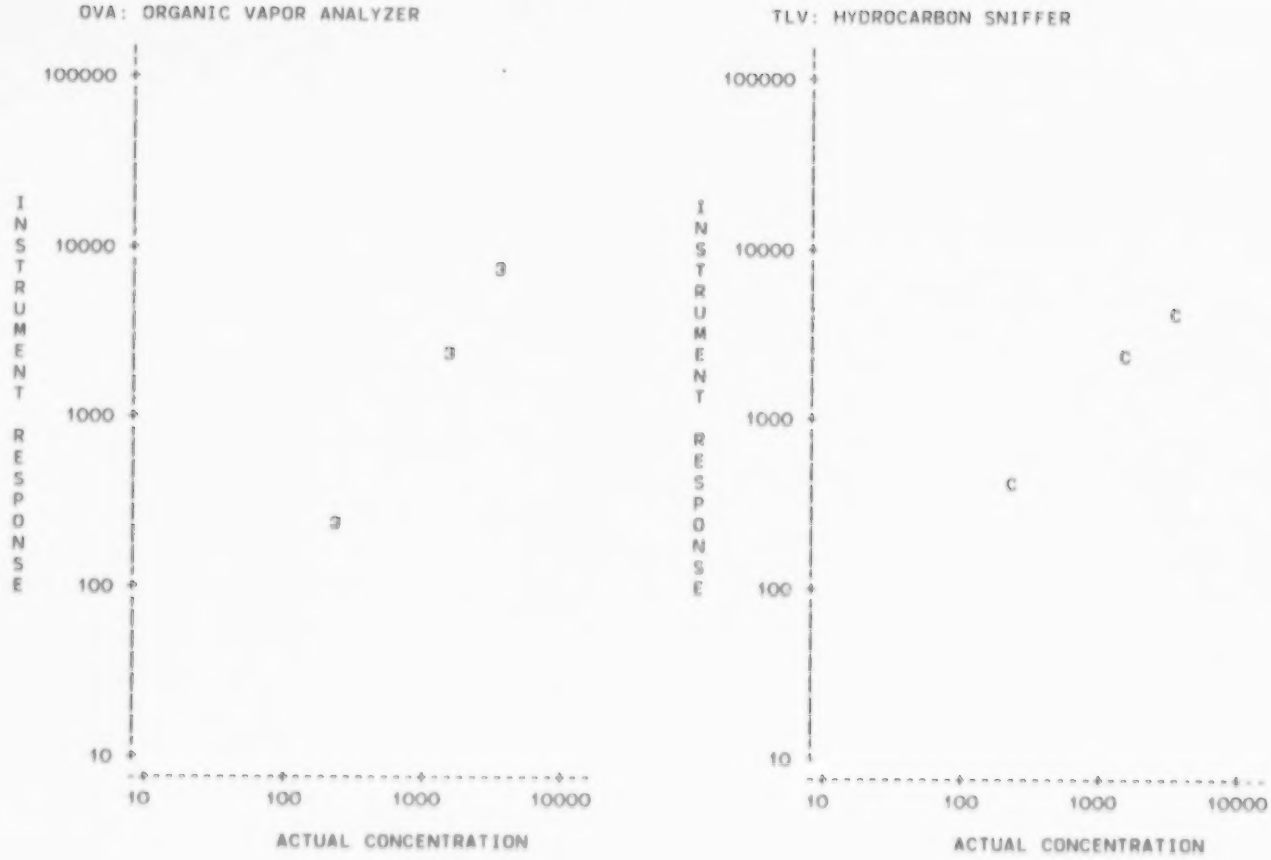


TABLE 5-100

RESPONSE FACTOR SUMMARY

HEXANE,N-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS — OVA METERS: 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
150	175	175	175	1.14	0.28	2							0.86		1	1.42		1
200	148	208	178	0.89	0.08	3	0.97		1	0.97		1	0.72		1			
250	259	259	259	1.05	0.22	2							0.83		1	1.28		1
350	394	394	394	1.07	0.23	2							0.84		1	1.30		1
400	435	435	435	1.01	0.00	2							1.01		1	1.01		1
550	555	555	555	0.82	0.11	2							0.71		1	0.92		1
700	703	703	703	0.80	0.09	2							0.71		1	0.89		1
800	837	837	837	0.66	0.04	2							0.70		1	0.62		1
1200	869	1165	1017	0.61	0.02	4							0.63	0.04	2	0.58	0.07	2
1500	1516	1526	1521	0.75	0.01	3	0.74		1	0.74		1	0.76		1			
1600	1720	1720	1720	0.72		1							0.72		1			
2000	2105	2105	2105	0.61		1							0.61		1			
2400	2352	2352	2352	0.47		1							0.47		1			
2800	3020	3020	3020	0.47	0.02	2							0.45		1	0.49		1
3200	3243	3243	3243	0.36	0.00	2							0.35		1	0.36		1
3600	3634	3634	3634	0.38	0.00	2							0.38		1	0.38		1
4000	3645	4095	3870	0.40	0.01	4	0.41		1	0.41		1	0.37		1	0.39		1
5000	5005	5005	5005															
6000	6073	6073	6073															
8000	7634	7750	7692															
		OVERALL MEANS		0.71	0.00	37	0.71	0.16	3	0.71	0.16	3	0.65	0.04	18	0.79	0.10	13

ESTIMATED AT 10,000 PPMV 0.31 95 % CONFIDENCE INTERVAL : (0.26, 0.36)

TABLE 5-100 (continued)

RESPONSE FACTOR SUMMARY

HEXANE,N-

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
150	175	175	175	0.48		1				0.48		1						
200	148	208	178	0.41	0.03	2				0.44		1						
250	259	259	259	0.53		1				0.53		1				0.38		1
350	394	394	394	0.63		1				0.63		1						
400	435	435	435	0.65		1				0.65		1						
550	555	555	555	0.57		1				0.57		1						
700	703	703	703	0.47		1				0.47		1						
800	837	837	837	0.45		1				0.45		1						
1200	869	1165	1017	0.45		2				0.45	0.03	2						
1500	1516	1526	1521	0.57	0.02	2				0.59		1						
1600	1720	1720	1720	0.65		1				0.65		1				0.56		1
2000	2105	2105	2105	0.66		1				0.66		1						
2400	2352	2352	2352	0.62		1				0.62		1						
2800	3020	3020	3020	0.70		1				0.70		1						
3200	3243	3243	3243	0.63		1				0.63		1						
3600	3634	3634	3634	0.68		1				0.68		1						
4000	3645	4095	3870	0.68	0.01	3				0.71		1	0.67		1	0.67		1
5000	5005	5005	5005	0.61		1				0.61		1						
6000	6073	6073	6073	0.69	0.00	2							0.68		1	0.69		1
8000	7634	7750	7692	0.69		1										0.69		1
	OVERALL MEANS			0.59	0.00	26				0.58	0.02	19	0.68	0.00	2	0.60	0.06	5

ESTIMATED AT 10,000 PPMV 0.72

95 % CONFIDENCE INTERVAL : (0.65, 0.79)

Figure 5-100

INSTRUMENT RESPONSE VS CONCENTRATION

HEXANE,N-

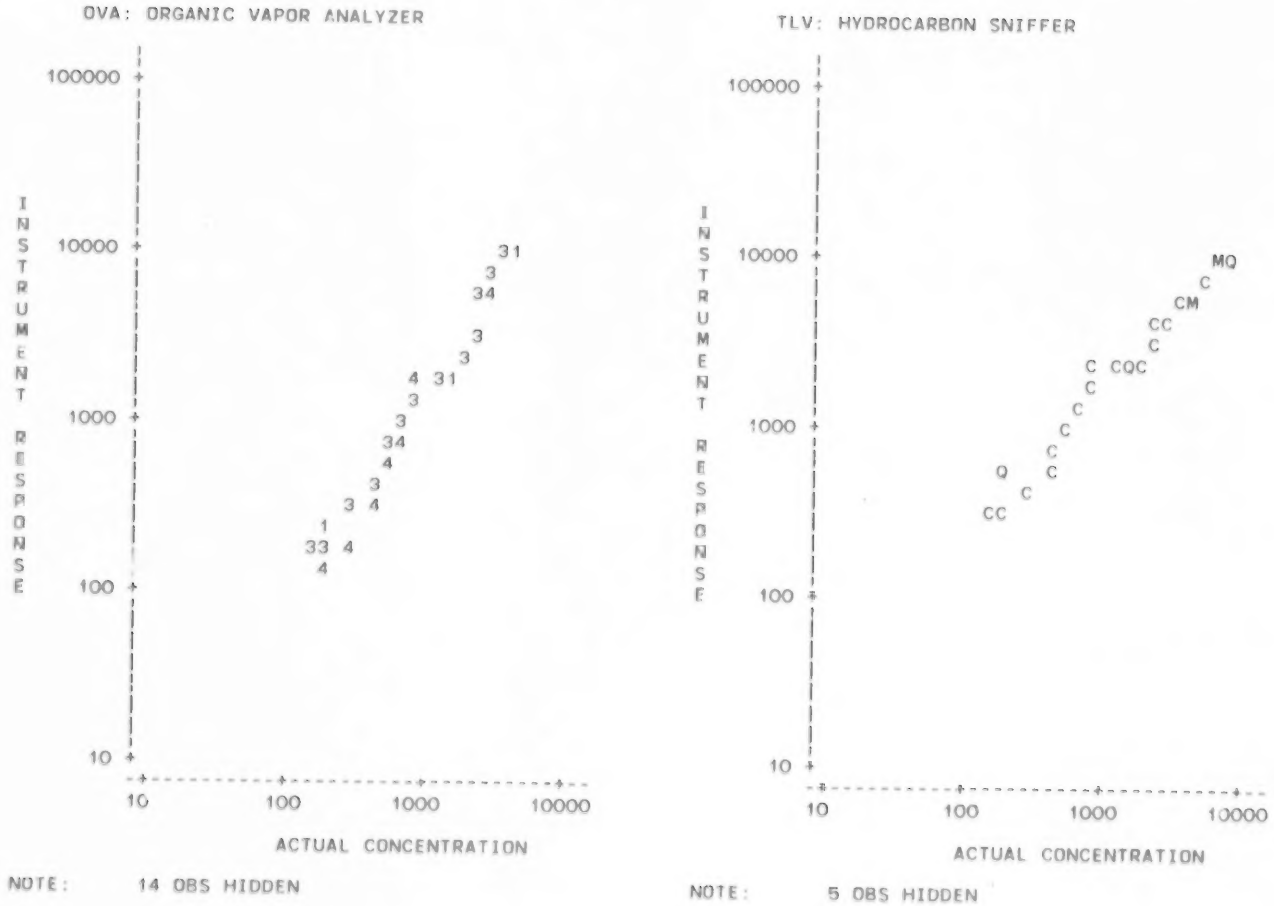


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TABLE 5-101

RESPONSE FACTOR SUMMARY

HEXENE, 1-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	225	225	225	1.32	0.05	2	1.27		1	1.36		1						
1500	1547	1547	1547	0.89	0.02	2	0.91		1	0.86		1						
3000	3209	3209	3209	0.50	0.03	2	0.47		1	0.53		1						
5000	4813	4813	4813															
8000	7737	7737	7737															
		OVERALL MEANS		0.90	0.00	6	0.88	0.23	3	0.92	0.24	3						

ESTIMATED AT 10,000 PPMV 0.39 95 % CONFIDENCE INTERVAL : (0.26, 0.58)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	225	225	225	1.60	0.63	2	2.22		1	0.97		1						
1500	1547	1547	1547	3.63	2.17	2	5.80		1	1.46		1						
3000	3209	3209	3209	7.75	6.06	2	13.81		1	1.69		1						
5000	4813	4813	4813	10.33	8.70	2	19.03		1	1.63		1						
8000	7737	7737	7737	4.72	3.60	2	8.32		1	1.13		1						
		OVERALL MEANS		5.61	0.42	10	9.84	2.97	5	1.38	0.14	5						

ESTIMATED AT 10,000 PPMV 2.92 95 % CONFIDENCE INTERVAL : (0.86, 9.89)

Figure 5-101

INSTRUMENT RESPONSE VS CONCENTRATION

HEXENE, 1-

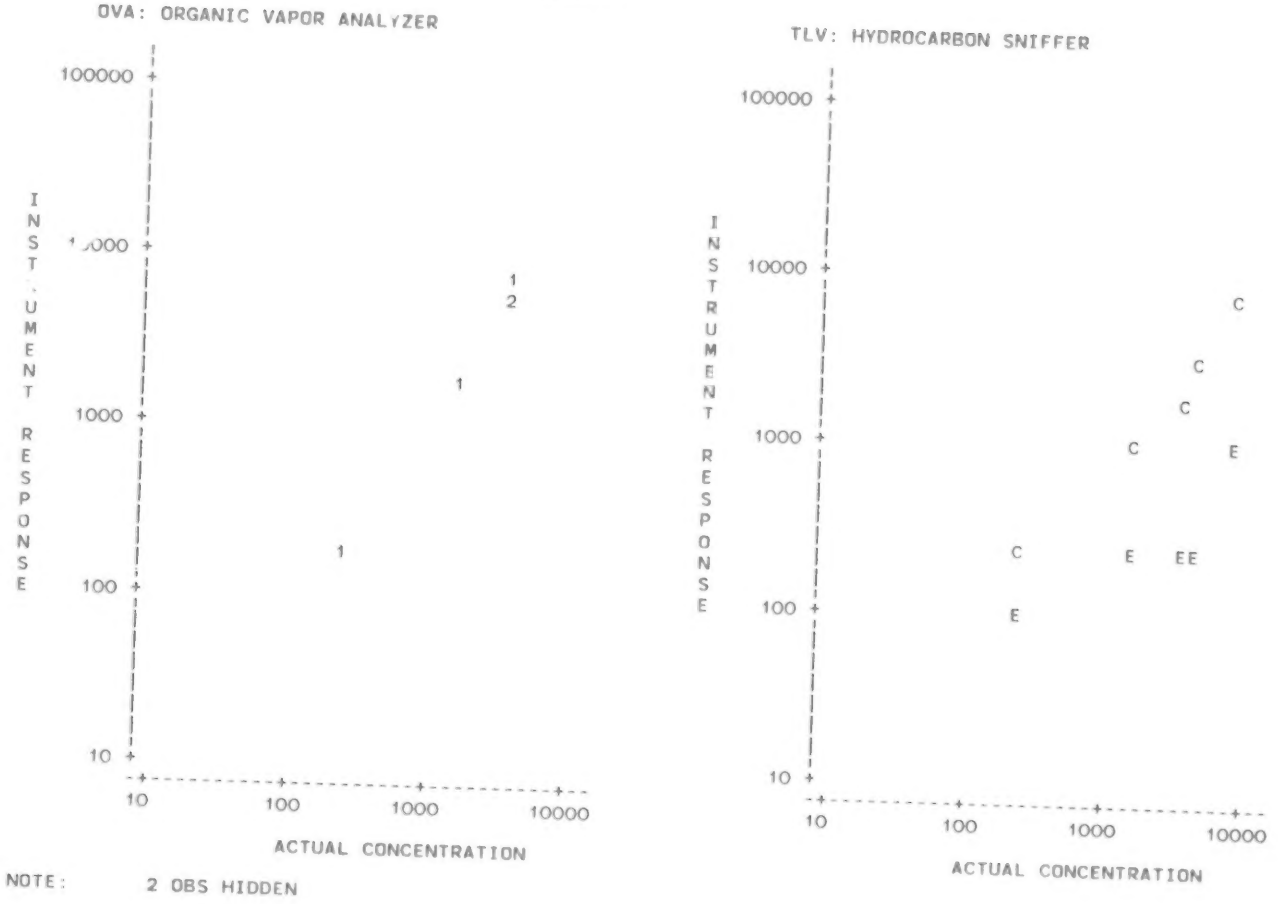


TABLE 5-102

RESPONSE FACTOR SUMMARY

HYDROXYACETONE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	229	229	229	12.81	1.07	2	11.74		1	13.88		1						
1500	1494	1494	1494	14.58	0.21	2	14.79		1	14.36		1						
5000	5561	5561	5561	7.53	0.50	2	8.04		1	7.03		1						
8000	8111	8111	8111	9.98	0.83	2	10.81		1	9.15		1						
		OVERALL MEANS		11.23	0.01	8	11.35	1.39	4	11.11	1.80	4						

ESTIMATED AT 10,000 PPMV 8.70

95 % CONFIDENCE INTERVAL : (6.51,11.64)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	229	229	229	5.54	0.44	2	5.98		1	5.10		1						
1500	1494	1494	1494	5.89	0.94	2	6.83		1	4.95		1						
5000	5561	5561	5561	8.65	2.65	2	11.30		1	6.01		1						
8000	8111	8111	8111	11.82	3.79	2	15.61		1	8.03		1						
		OVERALL MEANS		7.98	0.24	8	9.93	2.22	4	6.02	0.71	4						

ESTIMATED AT 10,000 PPMV 9.34

95 % CONFIDENCE INTERVAL : (6.21,14.06)

Figure 5-102

INSTRUMENT RESPONSE VS CONCENTRATION

HYDROXYACETONE

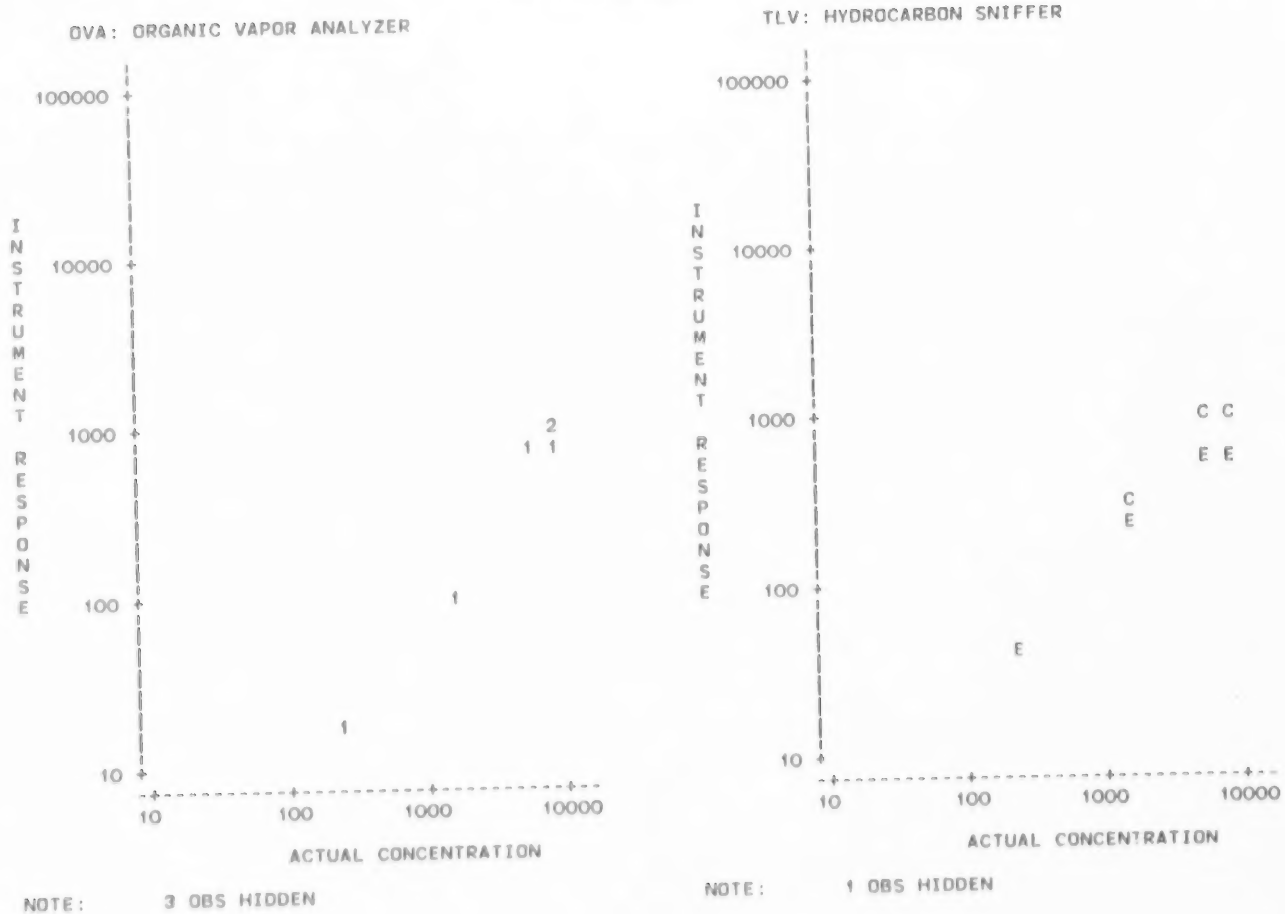


TABLE 5-103

RESPONSE FACTOR SUMMARY

ISOBUTANE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1000	1223	1223	1223	1.14	0.03	2	1.12		1	1.17		1						
2500	2187	2187	2187	0.27	0.01	2	0.27		1	0.26		1						
4000	4114	4114	4114	0.61	0.02	2	0.60		1	0.63		1						
5000	4967	4967	4967	0.50	0.00	2	0.50		1	0.50		1						
8000	7900	7900	7900															
13E3	13E3	13E3	13E3															
	OVERALL MEANS			0.63	0.00	8	0.62	0.18	4	0.64	0.19	4						

ESTIMATED AT 10,000 PPMV 0.30 95 % CONFIDENCE INTERVAL : (0.09, 0.95)

TLV INSTRUMENTS

RESPONSE FACTORS

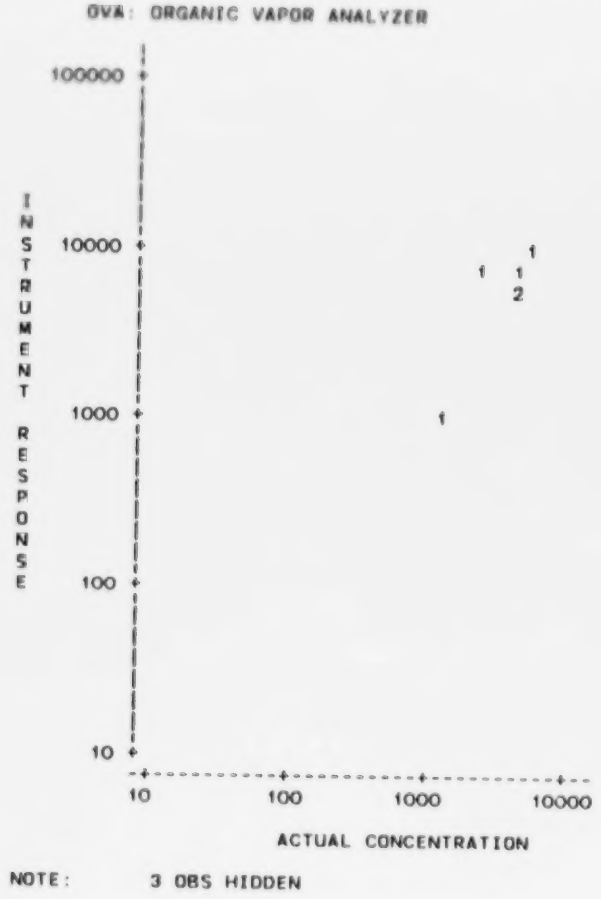
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
1000	1223	1223	1223	0.55		1										0.55		1
2500	2187	2187	2187	0.36	0.01	2	0.37		1	0.35		1						
4000	4114	4114	4114	0.64		1										0.64		1
5000	4967	4967	4967	0.63		1										0.63		1
8000	7900	7900	7900	0.58		1										0.58		1
13E3	13E3	13E3	13E3	0.65		1										0.65		1
	OVERALL MEANS			0.54	0.01	7	0.37		1	0.35		1				0.61	0.02	5

ESTIMATED AT 10,000 PPMV 0.61 95 % CONFIDENCE INTERVAL : (0.44, 0.86)

Figure 5-103

INSTRUMENT RESPONSE VS CONCENTRATION

ISOBUTANE



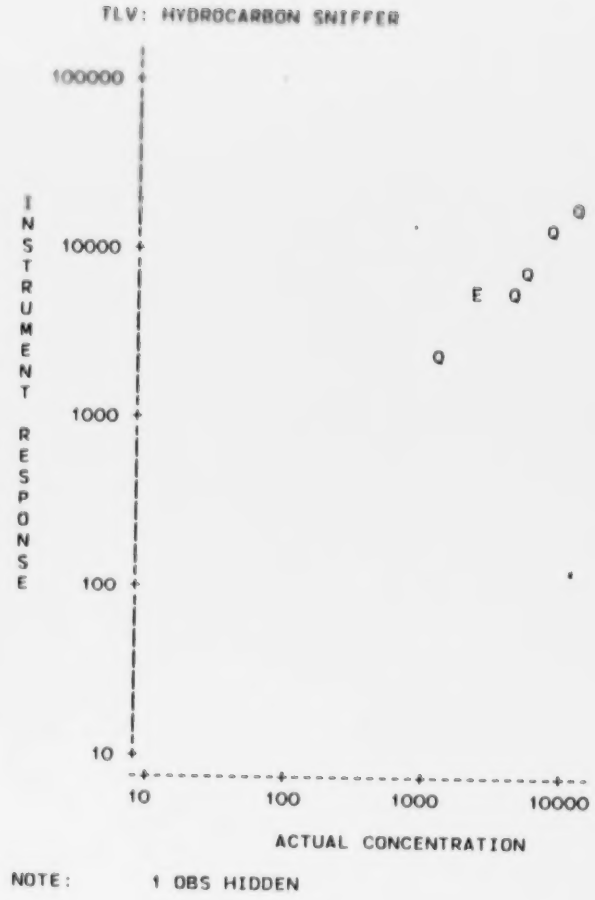


TABLE 5-104

RESPONSE FACTOR SUMMARY

ISOBUTYLENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
100	100	100	100	0.84	0.09	2	0.76		1	0.93		1						
300	294	294	294	1.27	0.08	2	1.19		1	1.35		1						
453	453	453	453	1.11	0.00	2	1.11		1	1.11		1						
			OVERALL MEANS	1.08	0.01	6	1.02	0.13	3	1.13	0.12	3						

ESTIMATED AT 10,000 PPMV 2.42 95 % CONFIDENCE INTERVAL : (1.01, 5.84)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
100	100	100	100	0.87	0.39	2	1.26		1	0.47		1						
300	294	294	294	2.19	1.22	2	3.41		1	0.97		1						
453	453	453	453	1.70	0.85	2	2.55		1	0.85		1						
			OVERALL MEANS	1.59	0.14	6	2.41	0.63	3	0.77	0.15	3						

ESTIMATED AT 10,000 PPMV 6.33 95 % CONFIDENCE INTERVAL : (0.09,460.4)

Figure 5-104

INSTRUMENT RESPONSE VS CONCENTRATION

ISOBUTYLENE

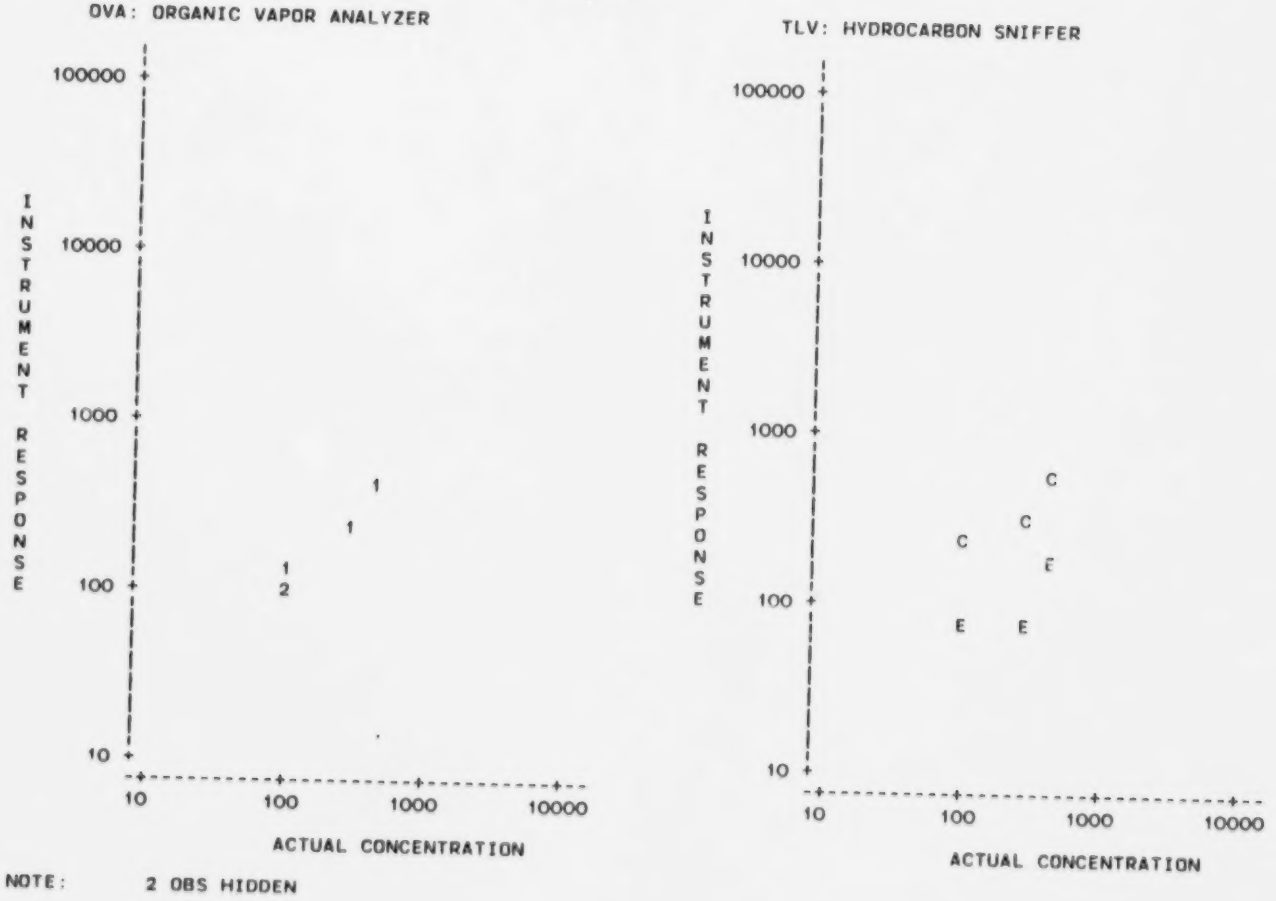


TABLE 5-105

RESPONSE FACTOR SUMMARY

ISOPRENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	217	217	217	1.99	0.12	2	1.86		1	2.11		1						
1500	1663	1663	1663	1.25	0.03	2	1.28		1	1.22		1						
5000	5209	5209	5209	0.55	0.03	2	0.57		1	0.52		1						
8000	7771	7771	7771															
OVERALL MEANS				1.26	0.00	6	1.24	0.37	3	1.28	0.46	3						

ESTIMATED AT 10,000 PPMV 0.48 95 % CONFIDENCE INTERVAL : (0.32, 0.72)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	217	217	217															
1500	1663	1663	1663															
5000	5209	5209	5209															
8000	7771	7771	7771															
OVERALL MEANS																		

ESTIMATED AT 10,000 PPMV 95 % CONFIDENCE INTERVAL : (,)

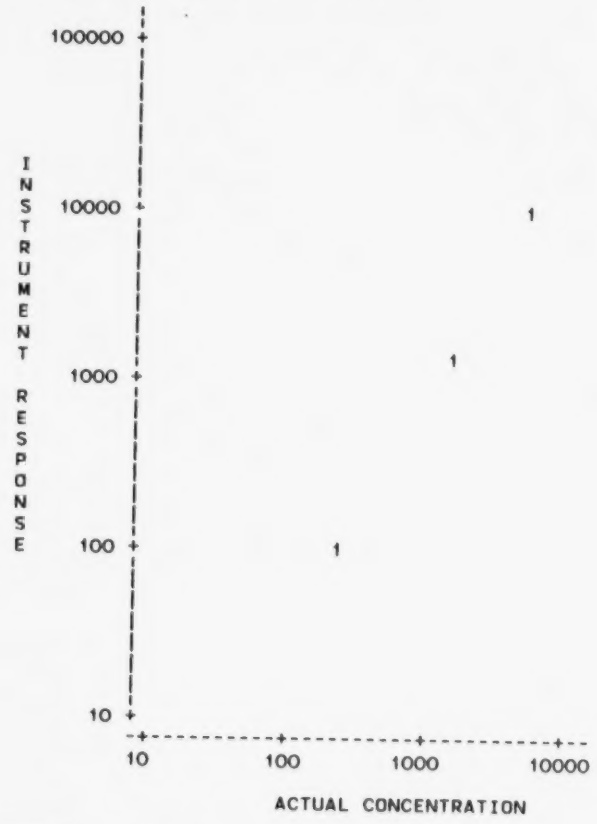
Figure 5-105

INSTRUMENT RESPONSE VS CONCENTRATION

ISOPRENE

OVA: ORGANIC VAPOR ANALYZER

TLV: HYDROCARBON SNIFFER



NOTE: 3 OBS HIDDEN

TABLE 5-106

RESPONSE FACTOR SUMMARY

ISOPROPANOL

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	202	202	202	1.97	0.03	2	1.93		1	2.00		1						
1500	1534	1534	1534	1.65	0.10	2	1.75		1	1.54		1						
8000	7871	7871	7871	0.87	0.03	2	0.90		1	0.83		1						
			OVERALL MEANS	1.49	0.01	6	1.53	0.32	3	1.46	0.34	3						

ESTIMATED AT 10,000 PPMV 0.90

95 % CONFIDENCE INTERVAL : (0.68, 1.18)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	202	202	202	0.95	0.15	2	1.10		1	0.80		1						
1500	1534	1534	1534	1.35	0.17	2	1.52		1	1.18		1						
8000	7871	7871	7871	1.26	0.11	2	1.37		1	1.14		1						
			OVERALL MEANS	1.18	0.02	6	1.33	0.12	3	1.04	0.12	3						

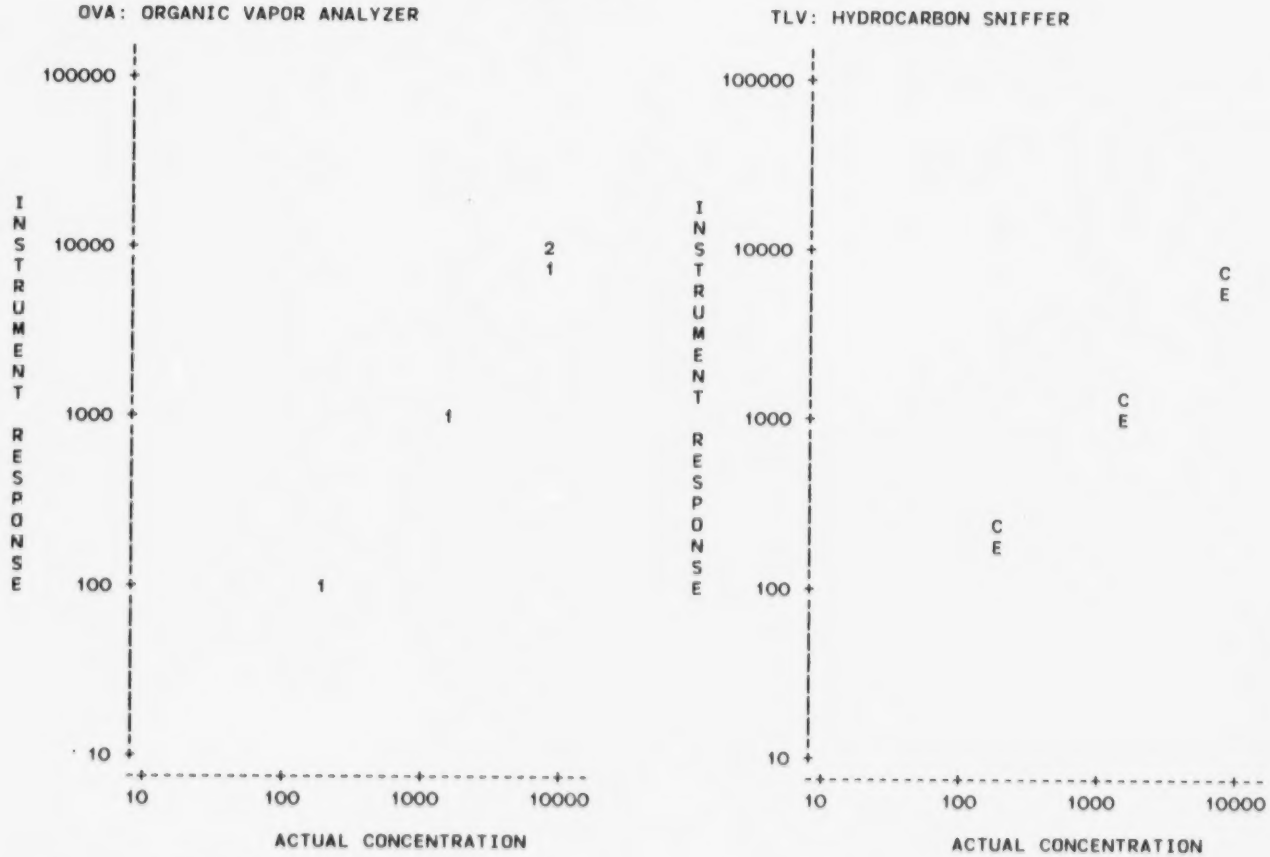
ESTIMATED AT 10,000 PPMV 1.35

95 % CONFIDENCE INTERVAL : (0.98, 1.86)

Figure 5-106

INSTRUMENT RESPONSE VS CONCENTRATION

ISOPROPANOL



NOTE: 2 OBS HIDDEN

TABLE 5-107

RESPONSE FACTOR SUMMARY

ISOPROPYL ACETATE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	198	198	198	1.09	0.03	2
1500	1512	1512	1512	0.95	0.06	2
6000	6247	6247	6247	0.69	0.01	2
8000	7749	7749	7749			
OVERALL MEANS				0.91	0.00	6
ESTIMATED AT 10,000 PPMV				0.68		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1.06		1	1.13		1						
0.89		1	1.01		1						
0.70		1	0.68		1						
0.88	0.10	3	0.94	0.13	3						

95 % CONFIDENCE INTERVAL : (0.58, 0.80)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	198	198	198	0.61		1
1500	1512	1512	1512	0.84		1
6000	6247	6247	6247	1.21		1
8000	7749	7749	7749	1.15		1
OVERALL MEANS				0.95		4
ESTIMATED AT 10,000 PPMV				1.25		

RESPONSE FACTORS

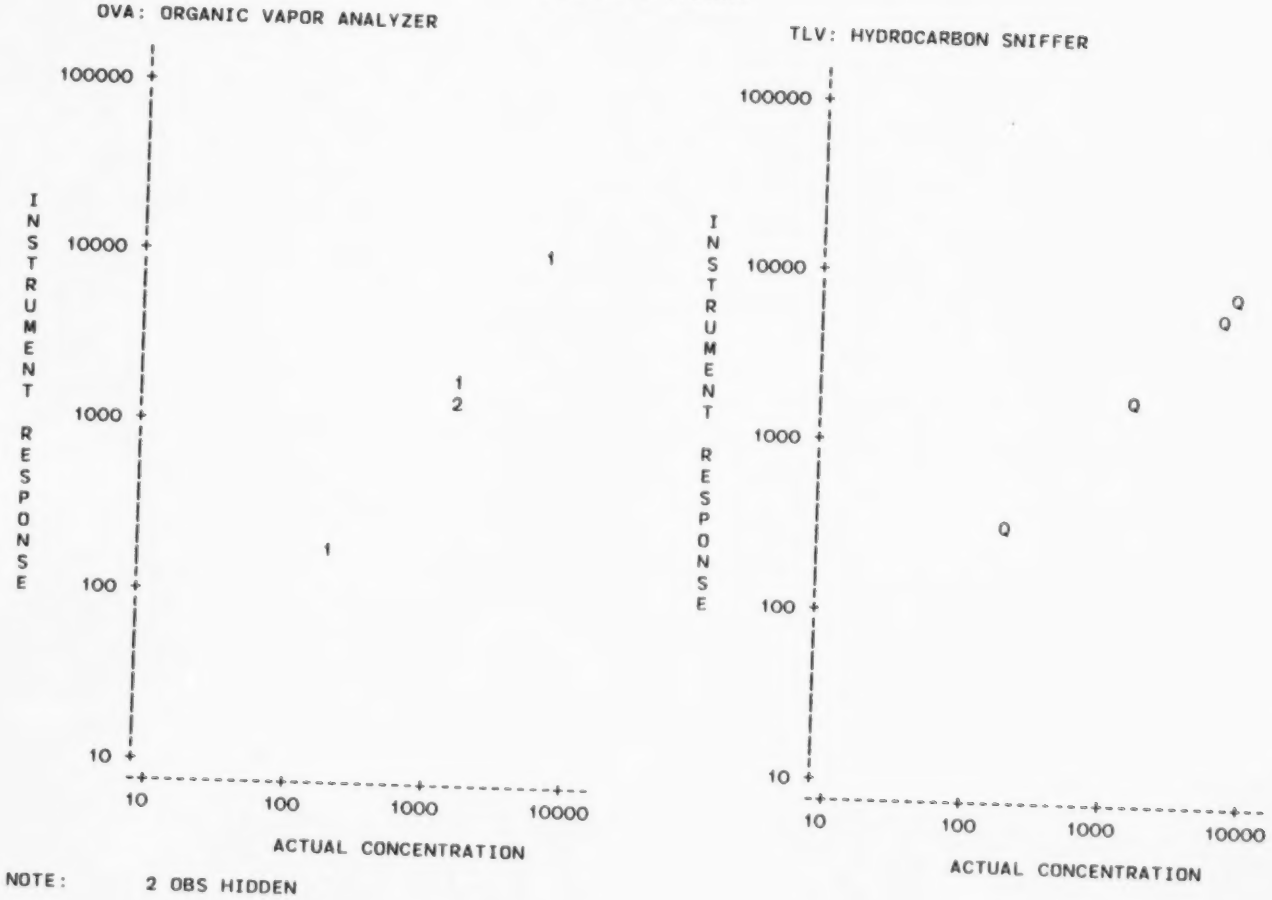
TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
									0.61		1
									0.84		1
									1.21		1
									1.15		1
									0.95	0.14	4

95 % CONFIDENCE INTERVAL : (1.11, 1.40)

Figure 5-107

INSTRUMENT RESPONSE VS CONCENTRATION

ISOPROPYL ACETATE



NOTE: 2 OBS HIDDEN

TABLE 5-108

RESPONSE FACTOR SUMMARY

ISOPROPYL CHLORIDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	227	227	227	1.39	0.16	2	1.23		1	1.55		1						
1500	1404	1404	1404	1.12	0.10	2	1.02		1	1.22		1						
5000	4782	4782	4782	0.69	0.01	2	0.68		1	0.70		1						
8000	7879	7879	7879	0.65	0.02	2	0.63		1	0.67		1						
OVERALL MEANS				0.96	0.01	8	0.89	0.14	4	1.03	0.21	4						

ESTIMATED AT 10,000 PPMV 0.62

95 % CONFIDENCE INTERVAL : (0.52, 0.73)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	227	227	227	1.21	0.06	2	1.28		1	1.15		1						
1500	1404	1404	1404	0.85	0.01	2	0.86		1	0.83		1						
5000	4782	4782	4782	1.08	0.01	2	1.09		1	1.07		1						
8000	7879	7879	7879	1.06	0.02	2	1.05		1	1.08		1						
OVERALL MEANS				1.05	0.00	8	1.07	0.09	4	1.03	0.07	4						

ESTIMATED AT 10,000 PPMV 0.99

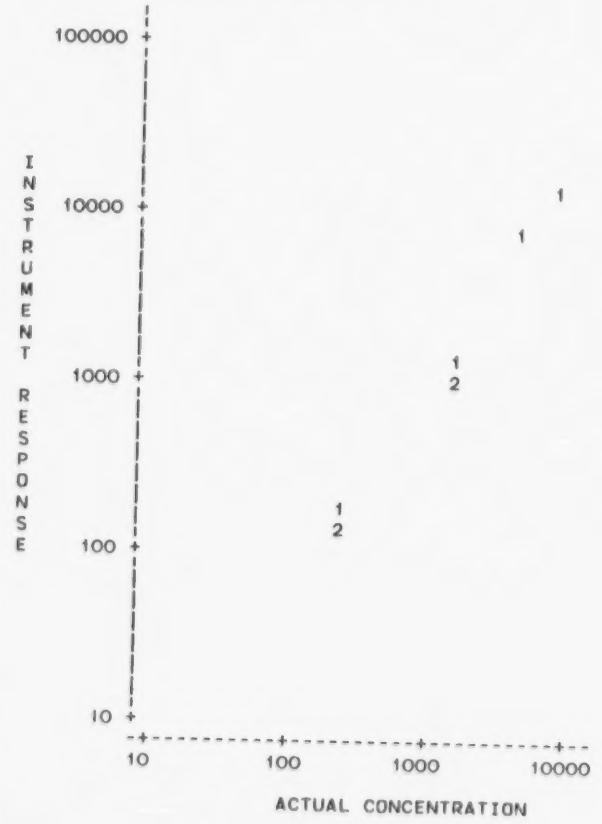
95 % CONFIDENCE INTERVAL : (0.81, 1.19)

Figure 5-108

INSTRUMENT RESPONSE VS CONCENTRATION

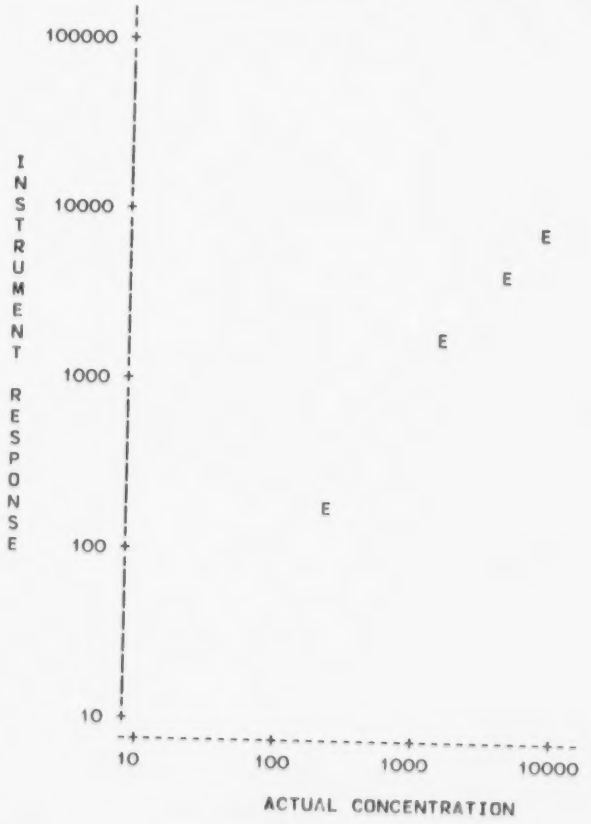
ISOPROPYL CHLORIDE

OVA: ORGANIC VAPOR ANALYZER



NOTE: 2 OBS HIDDEN

TLV: HYDROCARBON SNIFFER



NOTE: 4 OBS HIDDEN

TABLE 5-109

RESPONSE FACTOR SUMMARY

ISOVALERALDEHYDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	220	220	220	2.13	0.05	2	2.08		1	2.18		1						
1500	1524	1524	1524	1.23	0.05	2	1.18		1	1.27		1						
6000	6151	6151	6151	0.62	0.00	2	0.62		1	0.62		1						
8000	7808	7808	7808															
		OVERALL MEANS		1.32	0.01	6	1.29	0.43	3	1.36	0.45	3						

ESTIMATED AT 10,000 PPMV 0.55 95 % CONFIDENCE INTERVAL : (0.45, 0.66)

TLV INSTRUMENTS

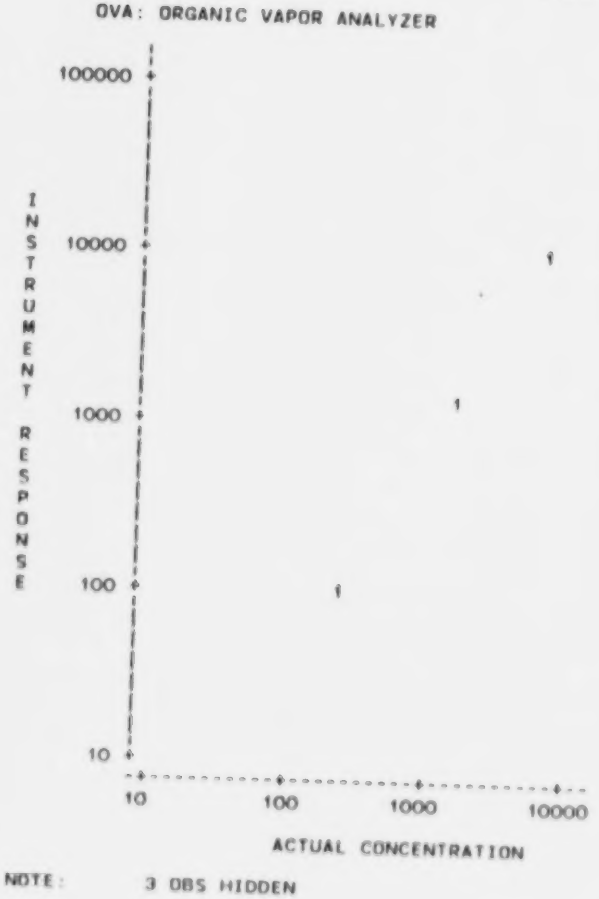
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	220	220	220	1.58	0.60	2	2.17		1	0.98		1						
1500	1524	1524	1524	2.55	0.94	2	3.48		1	1.61		1						
6000	6151	6151	6151	1.95	0.49	2	2.43		1	1.46		1						
8000	7808	7808	7808	2.36	0.81	2	3.17		1	1.55		1						
		OVERALL MEANS		2.11	0.09	8	2.82	0.31	4	1.40	0.14	4						

ESTIMATED AT 10,000 PPMV 2.04 95 % CONFIDENCE INTERVAL : (1.19, 3.51)

Figure 5-109

INSTRUMENT RESPONSE VS CONCENTRATION

ISOVALERALDEHYDE



NOTE: 3 OBS HIDDEN

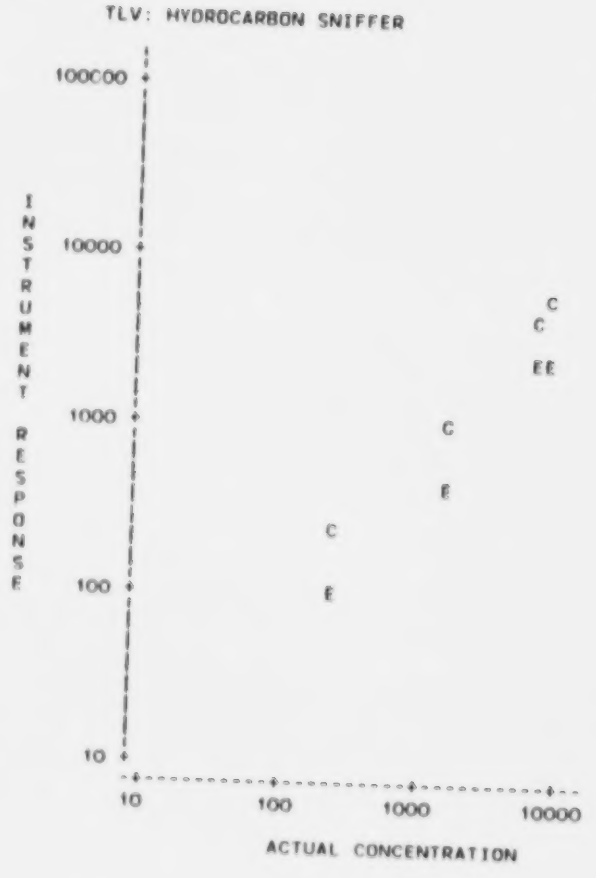


TABLE 5-110

RESPONSE FACTOR SUMMARY

MESITYL OXIDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	214	214	214	3.03	0.21	2	2.81		1	3.24		1						
1500	1444	1444	1444	2.09	0.05	2	2.04		1	2.14		1						
8000	7753	7753	7753	1.14	0.03	2	1.11		1	1.18		1						
		OVERALL MEANS		2.09	0.02	6	1.99	0.49	3	2.18	0.60	3						

ESTIMATED AT 10,000 PPMV 1.12 95 % CONFIDENCE INTERVAL : (0.94, 1.33)

TLV INSTRUMENTS

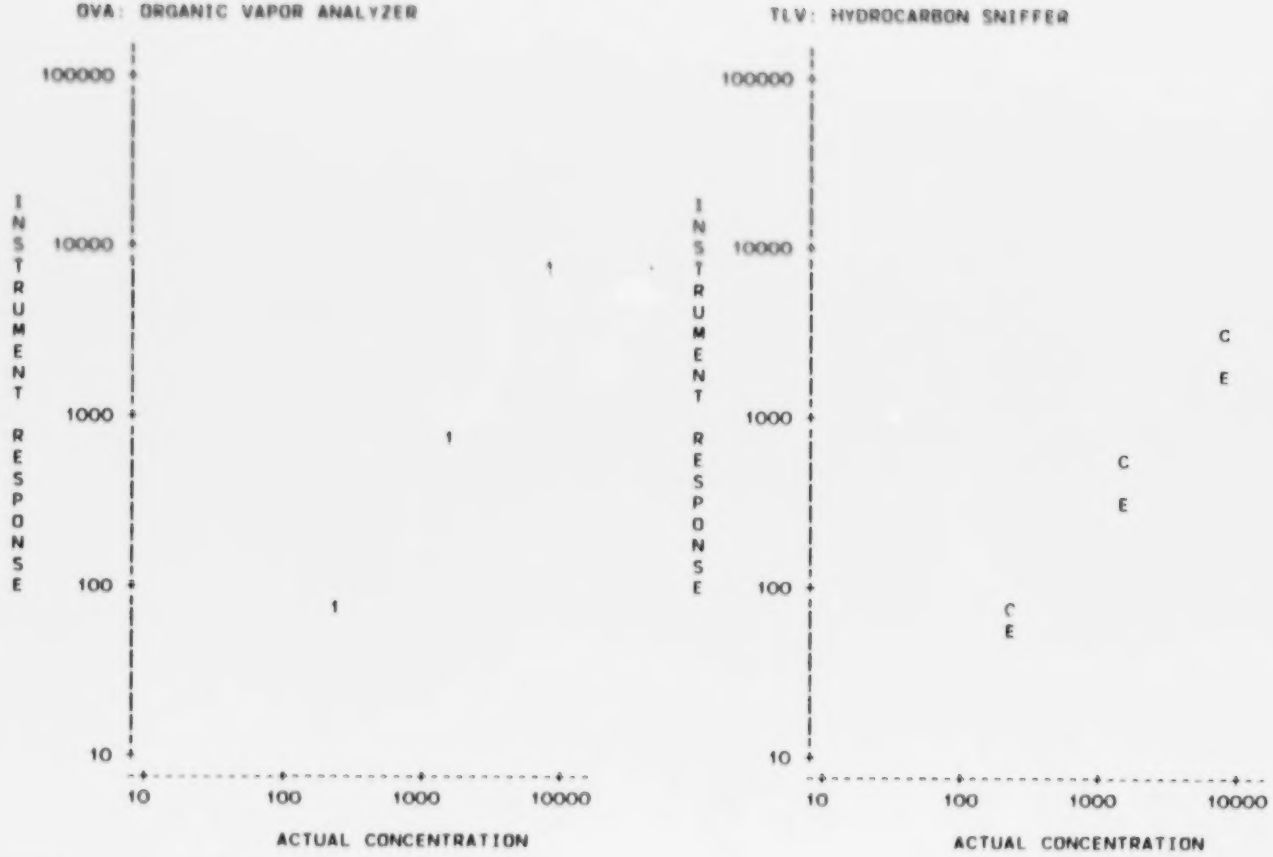
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	214	214	214	3.42	0.92	2	4.34		1	2.50		1						
1500	1444	1444	1444	3.37	1.03	2	4.40		1	2.34		1						
8000	7753	7753	7753	3.52	1.01	2	4.54		1	2.51		1						
		OVERALL MEANS		3.44	0.16	6	4.43	0.06	3	2.45	0.06	3						

ESTIMATED AT 10,000 PPMV 3.12 95 % CONFIDENCE INTERVAL : (1.68, 5.79)

Figure 5-110

INSTRUMENT RESPONSE VS CONCENTRATION

MESITYL OXIDE



NOTE: 3 OBS HIDDEN

TABLE 5-111

RESPONSE FACTOR SUMMARY

METHACROLEIN

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	300	300	300	3.43	0.54	2	2.90		1	3.97		1						
4000	4470	4470	4470	1.96	0.17	2	1.79		1	2.13		1						
8000	8606	8606	8606	1.19	0.18	2	1.01		1	1.37		1						
15E3	16E3	16E3	16E3															
OVERALL MEANS				2.20	0.05	6	1.90	0.55	3	2.49	0.77	3						

ESTIMATED AT 10,000 PPMV 1.27

95 % CONFIDENCE INTERVAL : (0.91, 1.77)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	300	300	300	3.05	0.54	2	3.60		1	2.51		1						
4000	4470	4470	4470	2.98	1.11	2	4.09		1	1.87		1						
8000	8606	8606	8606	3.88	1.84	2	5.72		1	2.04		1						
15E3	16E3	16E3	16E3	6.86	4.59	2	11.45		1	2.28		1						
OVERALL MEANS				4.20	0.25	8	6.21	1.80	4	2.18	0.14	4						

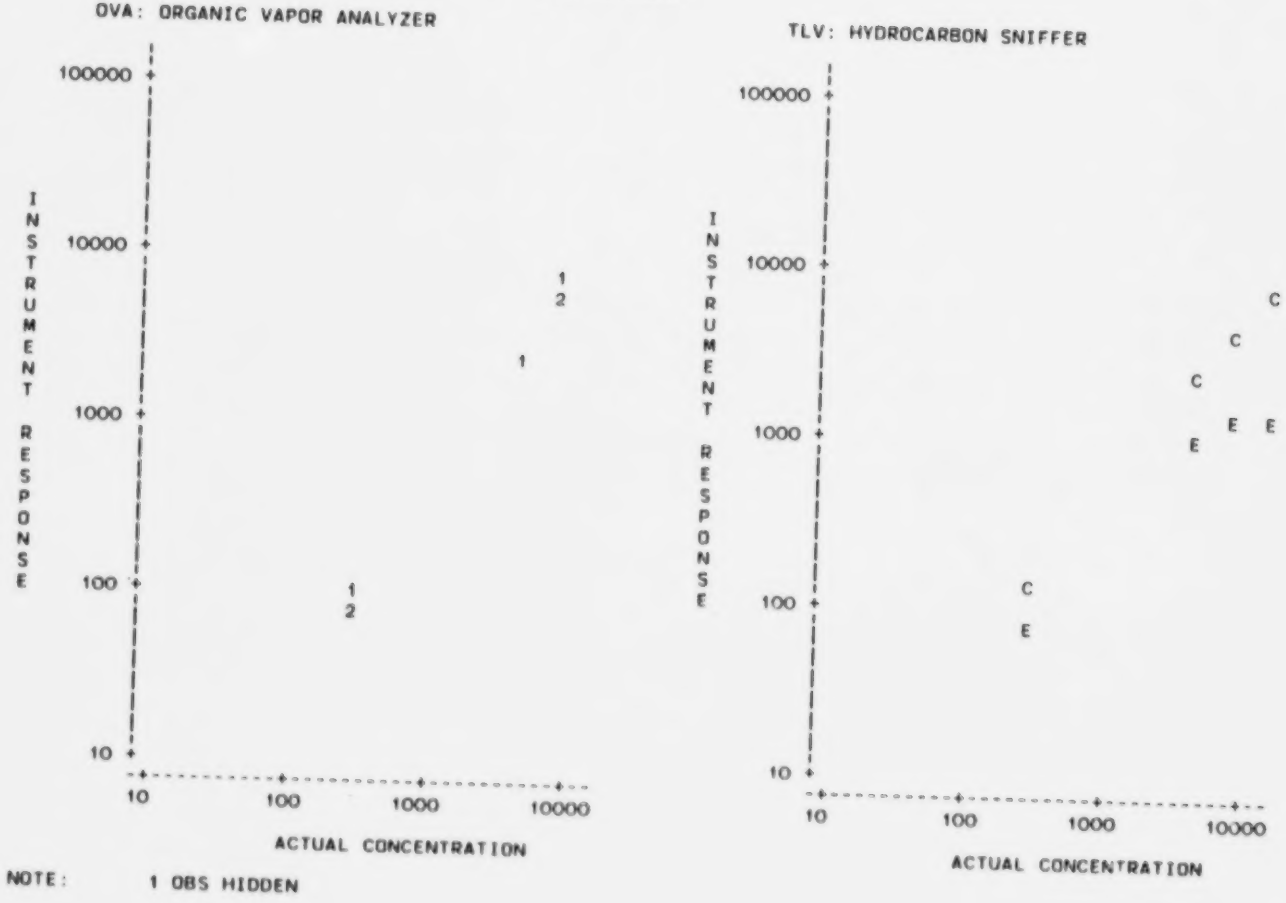
ESTIMATED AT 10,000 PPMV 3.10

95 % CONFIDENCE INTERVAL : (1.65, 5.83)

Figure 5-111

INSTRUMENT RESPONSE VS CONCENTRATION

METHACROLEIN



NOTE: 1 OBS HIDDEN

TABLE 5-112

RESPONSE FACTOR SUMMARY

METHACRYLIC ACID

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	237	237	237	11.37	2.59	2	8.79		1	13.96		1						
500	507	507	507	10.00	1.26	2	8.74		1	11.26		1						
720	754	754	754	4.24	0.60	2	3.64		1	4.83		1						
			OVERALL MEANS	8.54	0.25	6	7.06	1.71	3	10.02	2.71	3						

ESTIMATED AT 10,000 PPMV 0.71

95 % CONFIDENCE INTERVAL : (0.06, 7.84)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	237	237	237	3.77	0.57	2	4.34		1	3.19		1						
500	507	507	507	7.43	1.40	2	8.83		1	6.02		1						
720	754	754	754	3.93	0.86	2	4.80		1	3.07		1						
			OVERALL MEANS	5.04	0.16	6	5.99	1.43	3	4.09	0.98	3						

ESTIMATED AT 10,000 PPMV 6.61

95 % CONFIDENCE INTERVAL : (0.37,116.8)

Figure 5-112

INSTRUMENT RESPONSE VS CONCENTRATION

METHACRYLIC ACID

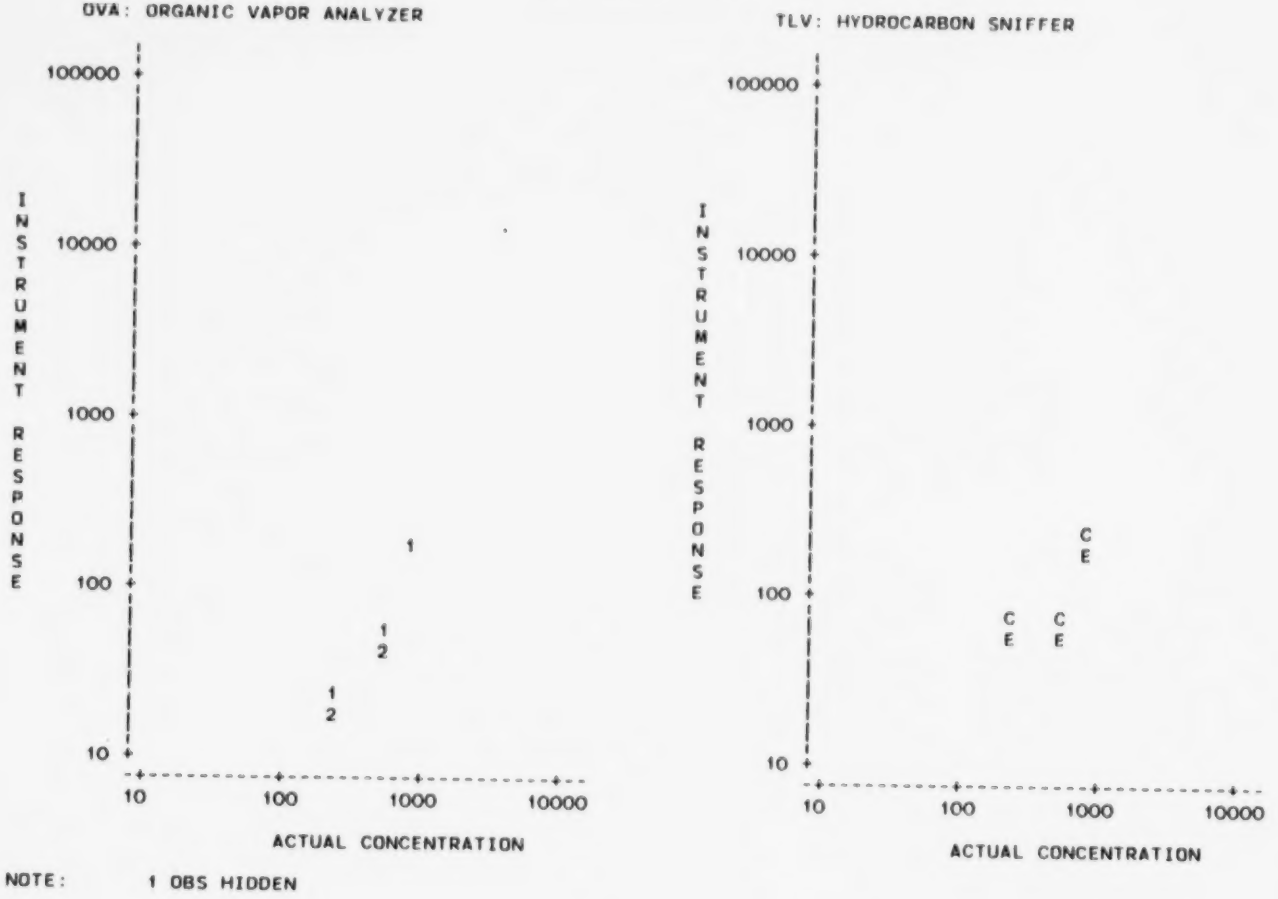


TABLE 5-113

RESPONSE FACTOR SUMMARY

METHANOL

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	42	56	50	11.86	0.14	5	12.04	0.84	2	11.75	1.72	3						
150	146	146	146	3.06	1.06	2							2.00		1	4.11		1
200	242	242	242	7.00		1							7.00		1			
500	496	540	521	8.18	0.93	8	9.02	1.21	3	9.08	1.47	3	4.43		1	6.74		1
550	42	42	42	7.17	1.19	2	5.97		1	8.36		1						
1000	1020	1020	1020	5.75	0.83	2							4.93		1	6.58		1
1500	1695	1766	1731	7.60	0.79	3							7.04	0.43	2	8.72		1
2000	2141	2141	2141	6.67	0.59	2							6.08		1	7.26		1
3500	3409	3409	3409	6.86	0.03	2							6.83		1	6.89		1
5000	4772	5136	4954	6.44	0.23	4	6.08		1	6.01		1	6.91		1	6.76		1
7500	7719	7719	7719	6.84	0.38	2							7.23		1	6.46		1
8000	8417	8836	8611	7.72	0.70	8	8.97	0.50	3	6.86	0.90	4	7.41		1			
10E3	10E3	10E3	10E3	5.51	0.37	2							5.88		1	5.14		1
15E3	18E3	18E3	18E3	4.99	0.67	2							5.66		1	4.33		1
20E3	21E3	21E3	21E3	4.07	0.59	2							4.66		1	3.48		1
30E3	30E3	30E3	30E3	3.76		1							3.76		1			
40E3	45E3	45E3	45E3															
50E3	52E3	52E3	52E3															
		OVERALL MEANS		7.24	0.01	48	9.01	0.73	10	8.69	0.82	12	5.79	0.41	15	6.04	0.48	11

ESTIMATED AT 10,000 PPMV 5.69 95 % CONFIDENCE INTERVAL : (4.96, 6.52)

TABLE 5-113 (continued)

RESPONSE FACTOR SUMMARY

METHANOL

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	RESPONSE FACTORS OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
50	42	56	50	1.73	0.06	4	1.67	0.49	2	1.79	0.12	2						
150	146	146	146	0.68		1				0.68		1						
200	242	242	242	1.24		1				1.24		1						
500	496	540	521	1.39	0.15	6	1.18	0.57	2	1.50	0.10	4						
550	42	42	42	1.03		1				1.03		1						
1000	1020	1020	1020	1.56		1				1.56		1						
1500	1695	1766	1731	1.68		2				1.68	0.16	2						
2000	2141	2141	2141	1.32		1				1.32		1						
3500	3409	3409	3409	1.48		1				1.48		1						
5000	4772	5136	4954	1.82	0.19	3	2.08		1	1.69	0.14	2						
7500	7719	7719	7719	2.09		1				2.09		1						
8000	8417	8836	8611	2.11	0.32	7	2.47	0.59	3	1.84	0.05	4						
10E3	10E3	10E3	10E3	2.09		1				2.09		1						
15E3	18E3	18E3	18E3	2.46		1				2.46		1						
20E3	21E3	21E3	21E3	2.45		1				2.45		1						
30E3	30E3	30E3	30E3															
40E3	45E3	45E3	45E3															
50E3	52E3	52E3	52E3															
		OVERALL MEANS		1.73	0.00	32	1.90	0.31	8	1.67	0.08	24						

ESTIMATED AT 10,000 PPMV 1.88 95 % CONFIDENCE INTERVAL : (1.62, 2.18)

Figure 5-113

INSTRUMENT RESPONSE VS CONCENTRATION

METHANOL

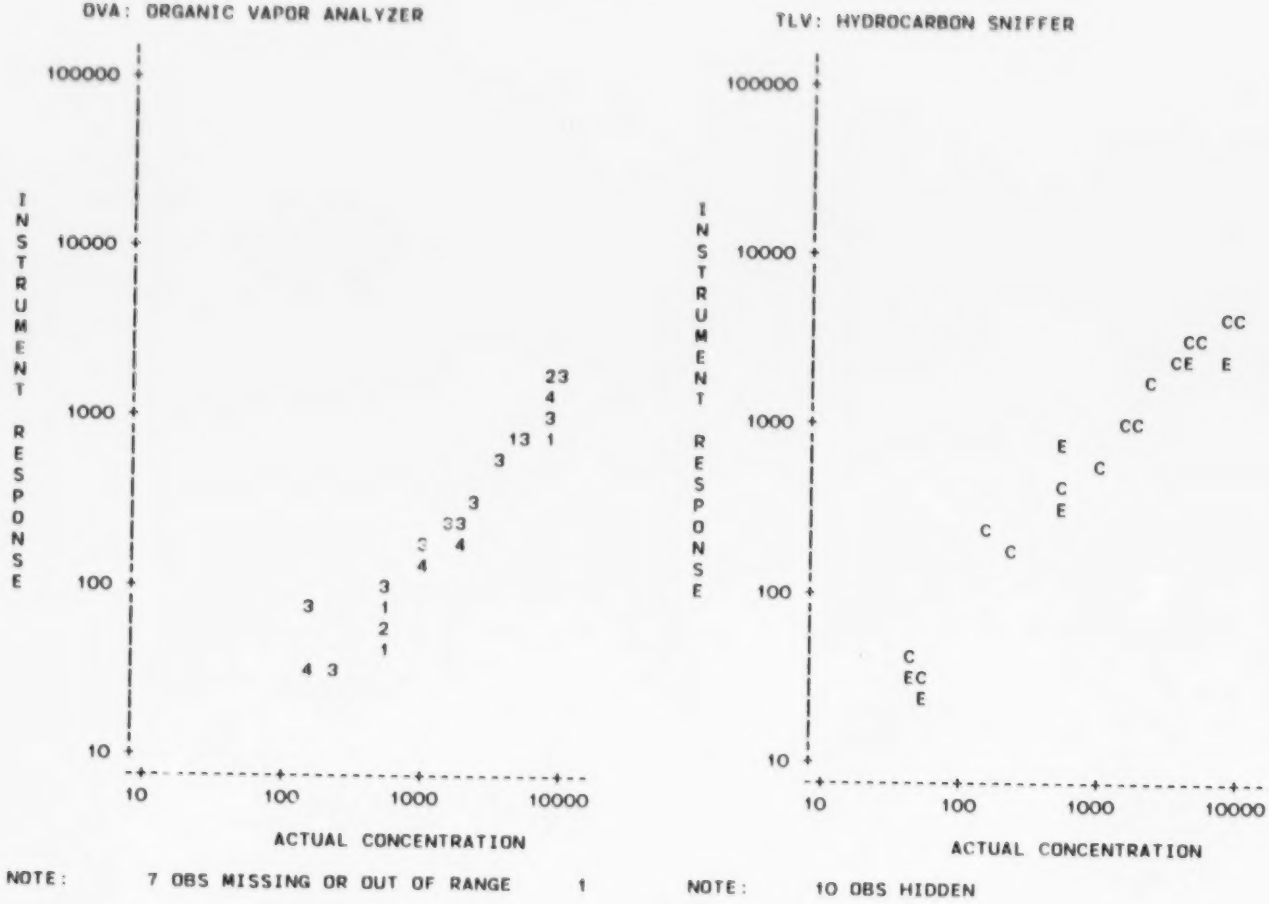


TABLE 5-114

RESPONSE FACTOR SUMMARY

METHOXY-ETHANOL,2-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	202	202	202	6.33	0.88	2	5.45		1	7.20		1						
1500	1537	1537	1537	4.99	0.29	2	4.70		1	5.28		1						
7300	7813	7813	7813	2.66	0.14	2	2.52		1	2.79		1						
		OVERALL MEANS		4.66	0.07	6	4.22	0.88	3	5.09	1.28	3						

ESTIMATED AT 10,000 PPMV 2.70 95 % CONFIDENCE INTERVAL : (1.99, 3.67)

TLV INSTRUMENTS

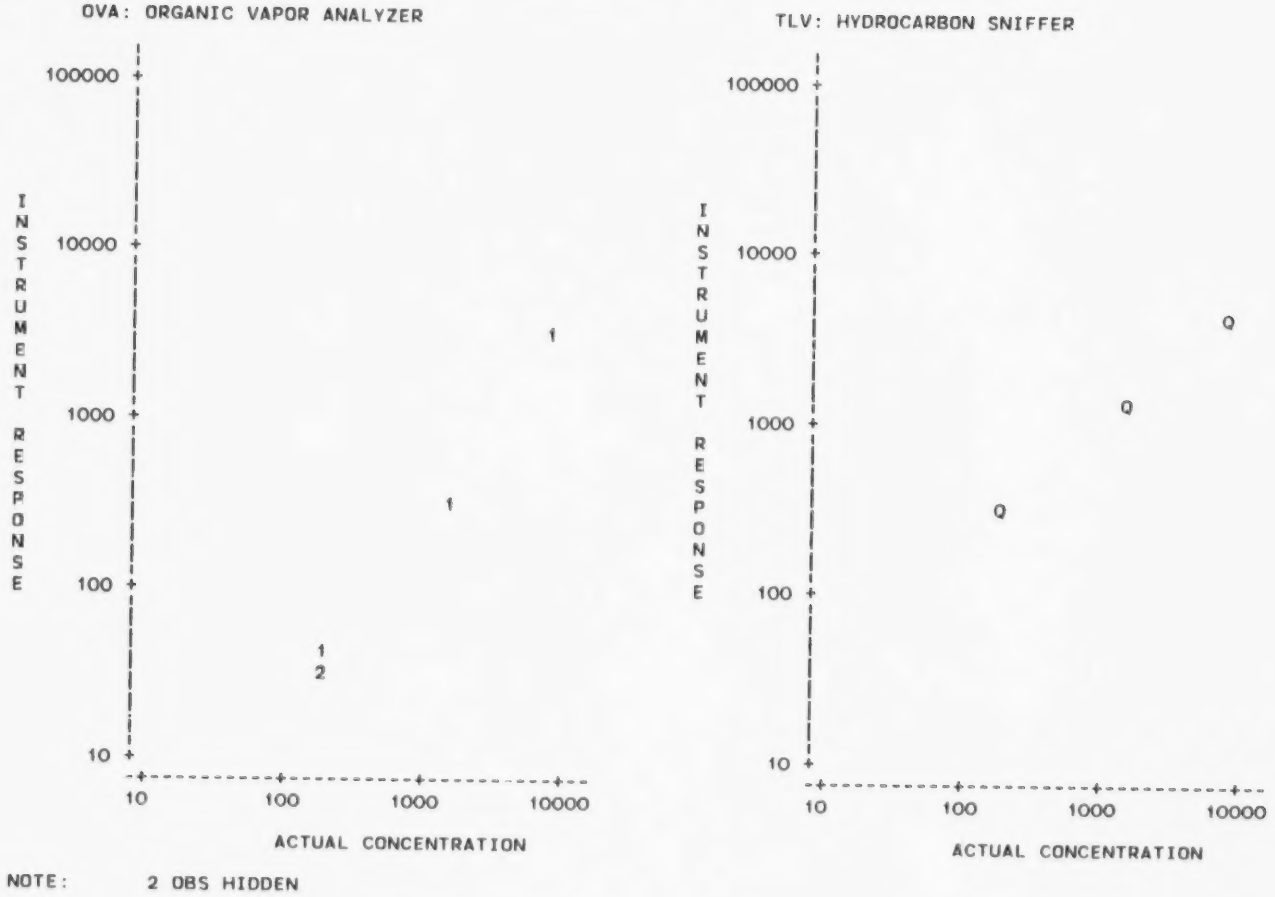
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	202	202	202	0.64		1										0.64		1
1500	1537	1537	1537	1.28		1										1.28		1
7300	7813	7813	7813	1.98		1										1.98		1
		OVERALL MEANS		1.30		3										1.30	0.39	3

ESTIMATED AT 10,000 PPMV 2.19 95 % CONFIDENCE INTERVAL : (1.85, 2.60)

Figure 5-114

INSTRUMENT RESPONSE VS CONCENTRATION

METHOXY-ETHANOL,2-



NOTE: 2 OBS HIDDEN

TABLE 5-115

RESPONSE FACTOR SUMMARY

METHYL ACETATE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	226	226	226	2.19	0.17	2	2.02		1	2.36		1						
1500	1574	1574	1574	2.12	0.14	2	1.98		1	2.26		1						
8000	8197	8197	8197	1.77	0.05	2	1.73		1	1.82		1						
		OVERALL MEANS		2.03	0.02	6	1.91	0.09	3	2.15	0.16	3						

ESTIMATED AT 10,000 PPMV 1.80 95 % CONFIDENCE INTERVAL : (1.55, 2.08)

TLV INSTRUMENTS

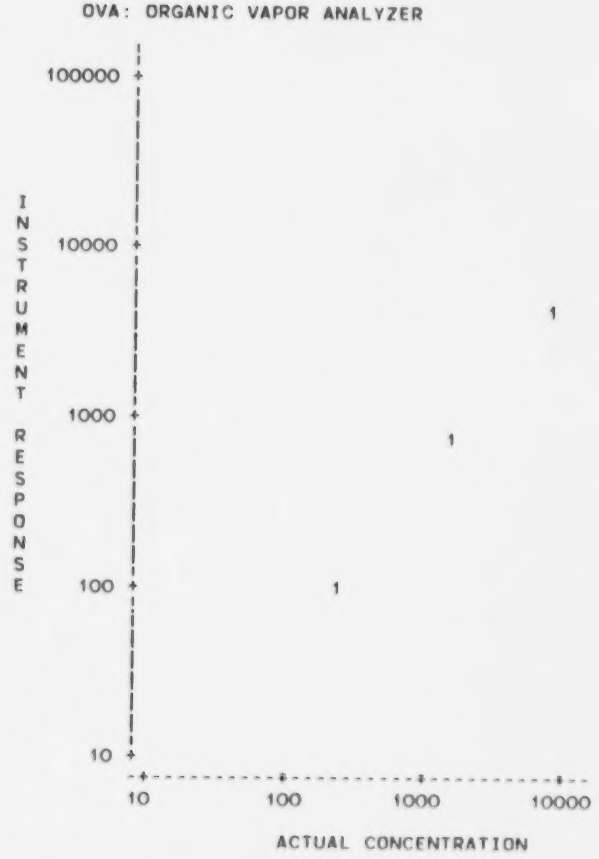
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	226	226	226	1.26	0.11	2	1.38		1	1.15		1						
1500	1574	1574	1574	1.67	0.08	2	1.74		1	1.59		1						
8000	8197	8197	8197	1.67	0.09	2	1.76		1	1.58		1						
		OVERALL MEANS		1.53	0.02	6	1.63	0.13	3	1.44	0.14	3						

ESTIMATED AT 10,000 PPMV 1.76 95 % CONFIDENCE INTERVAL : (1.47, 2.12)

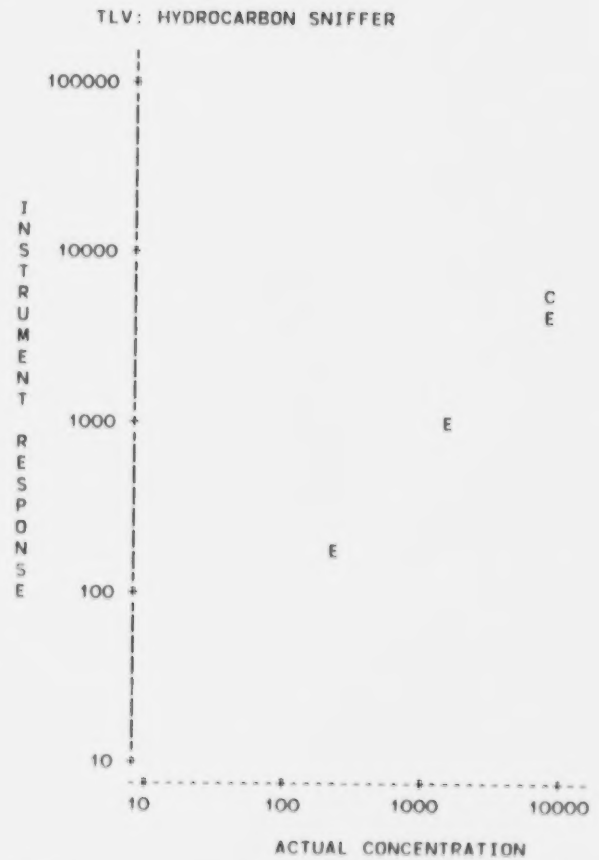
Figure 5-115

INSTRUMENT RESPONSE VS CONCENTRATION

METHYL ACETATE



NOTE: 3 OBS HIDDEN



NOTE: 2 OBS HIDDEN

TABLE 5-116

RESPONSE FACTOR SUMMARY

METHYL ACETYLENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
1000	957	957	957	1.01	0.04	2	0.97		1	1.04		1						
4000	4073	4073	4073	0.67	0.00	2	0.67		1	0.67		1						
5000	4772	4772	4772	0.66	0.01	2	0.65		1	0.67		1						
6000	5917	5917	5917															
12E3	12E3	12E3	12E3															
		OVERALL MEANS		0.78	0.00	6	0.76	0.10	3	0.80	0.12	3						
	ESTIMATED AT 10,000 PPMV			0.53			95 % CONFIDENCE INTERVAL : (0.50, 0.57)											

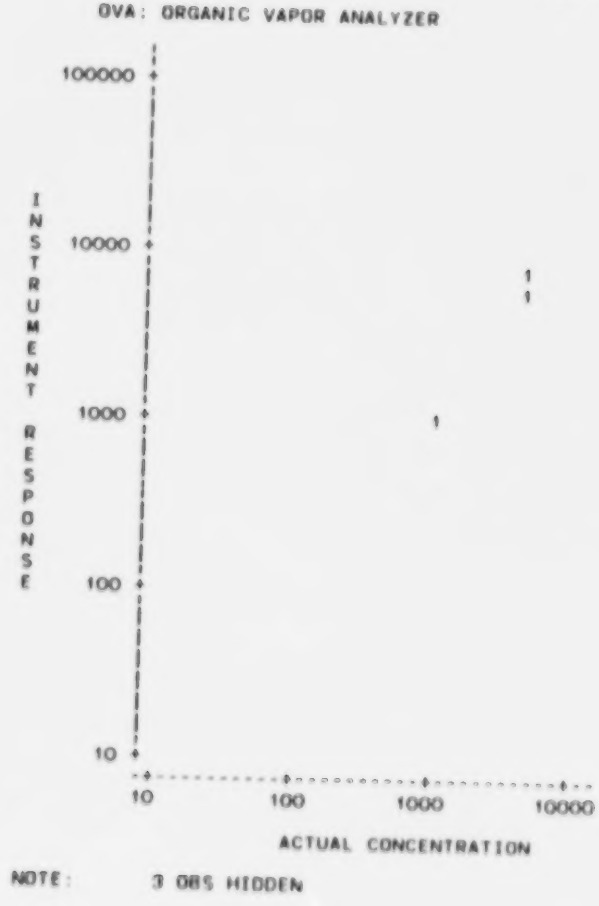
TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
1000	957	957	957	2.07		1										2.07		1
4000	4073	4073	4073	2.94		1										2.94		1
5000	4772	4772	4772	3.18		1										3.18		1
6000	5917	5917	5917	3.20		1										3.20		1
12E3	12E3	12E3	12E3	4.40		1										4.40		1
		OVERALL MEANS		3.16		5										3.16	0.37	5
	ESTIMATED AT 10,000 PPMV			3.92			95 % CONFIDENCE INTERVAL : (3.59, 4.29)											

Figure 5-116

INSTRUMENT RESPONSE VS CONCENTRATION

METHYL ACETYLENE



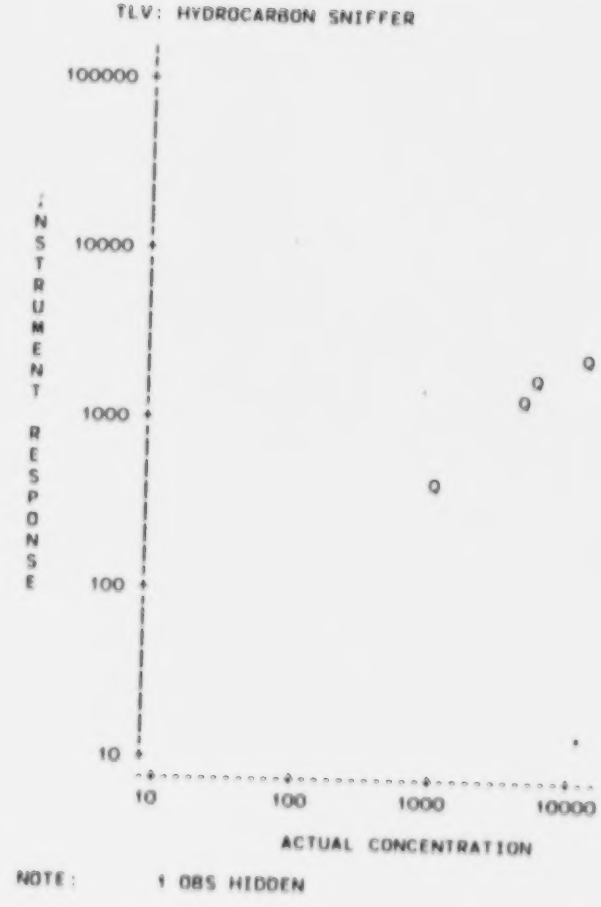


TABLE 5-117

RESPONSE FACTOR SUMMARY

METHYL CHLORIDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1000	1259	1259	1259	5.50	0.80	2							4.70		1	6.30		1
4500	4625	4625	4625	2.65	0.08	2							2.73		1	2.58		1
8000	8716	8716	8716	1.92	0.18	2							2.10		1	1.74		1
		OVERALL MEANS		3.36	0.03	6							3.18	0.78	3	3.54	1.40	3

ESTIMATED AT 10,000 PPMV 1.75

95 % CONFIDENCE INTERVAL : (1.44, 2.14)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
1000	1259	1259	1259	6.90		1				6.90		1						
4500	4625	4625	4625	3.19		1				3.19		1						
8000	8716	8716	8716	2.86		1				2.86		1						
		OVERALL MEANS		4.32		3				4.32	1.30	3						

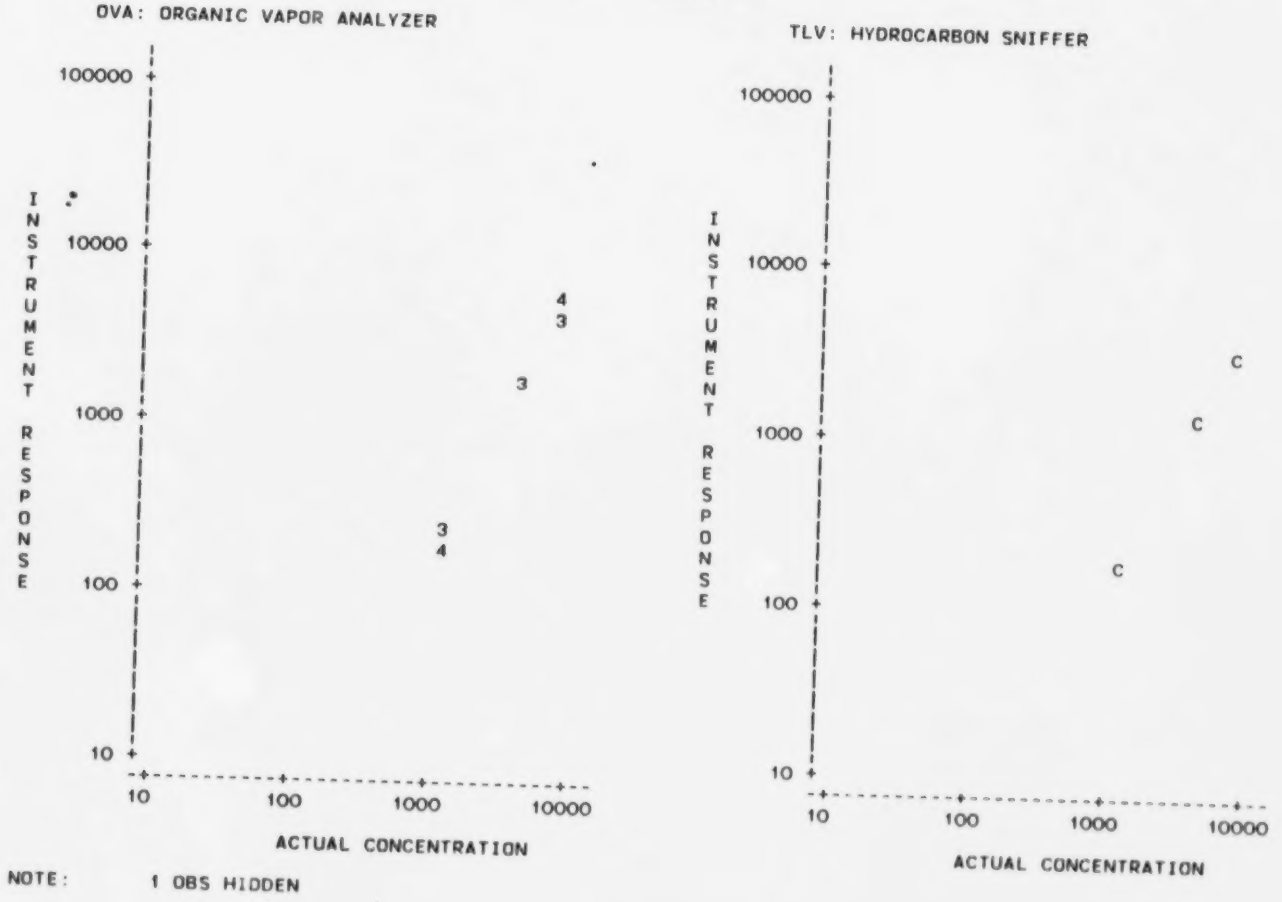
ESTIMATED AT 10,000 PPMV 2.45

95 % CONFIDENCE INTERVAL : (1.62, 3.73)

Figure 5-117

INSTRUMENT RESPONSE VS CONCENTRATION

METHYL CHLORIDE



NOTE: 1 OBS HIDDEN

TABLE 5-118

RESPONSE FACTOR SUMMARY

METHYL ETHYL KETONE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	63	63	63	2.72	0.41	2	2.32		1	3.13		1						
200	187	187	187	1.00		1							1.00		1			
500	546	546	546	1.25	0.12	2	1.13		1	1.37		1						
1500	1785	1785	1785	1.00		1							1.00		1			
4000	4466	5106	4786	0.74	0.02	3	0.71		1	0.79		1	0.72		1			
8000	8648	8648	8648															
OVERALL MEANS				1.35	0.02	9	1.39	0.48	3	1.76	0.70	3	0.91	0.09	3			

ESTIMATED AT 10,000 PPMV 0.57

95 % CONFIDENCE INTERVAL : (0.40, 0.81)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
50	63	63	63	1.38	0.10	2	1.48		1	1.27		1						
200	187	187	187	0.86		1				0.86		1						
500	546	546	546	1.31	0.17	2	1.48		1	1.14		1						
1500	1785	1785	1785	0.98		1				0.98		1						
4000	4466	5106	4786	1.14	0.08	3	1.26		1	1.08	0.07	2						
8000	8648	8648	8648	1.24	0.12	2	1.36		1	1.11		1						
OVERALL MEANS				1.19	0.01	11	1.39	0.03	4	1.08	0.05	7						

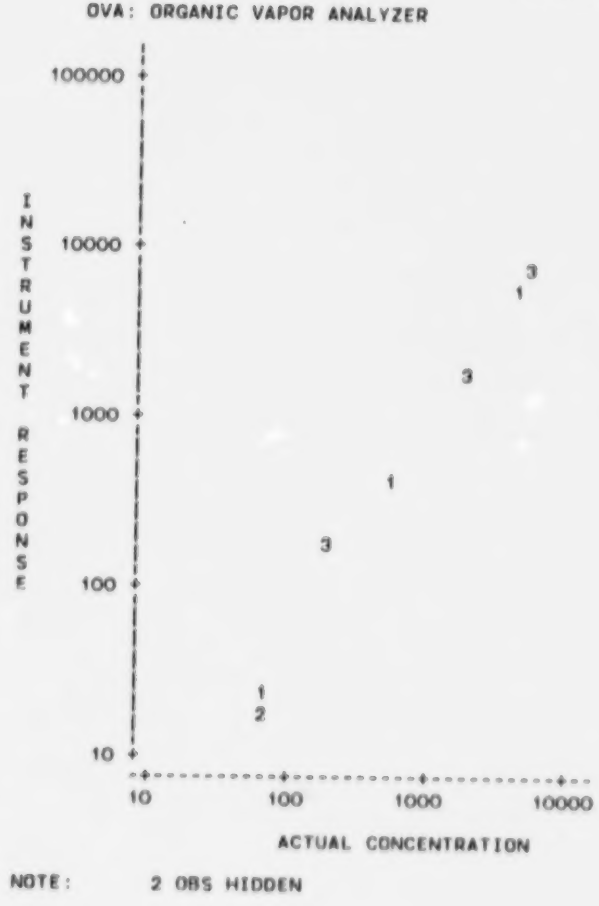
ESTIMATED AT 10,000 PPMV 1.12

95 % CONFIDENCE INTERVAL : (0.93, 1.35)

Figure 5-118

INSTRUMENT RESPONSE VS CONCENTRATION

METHYL ETHYL KETONE



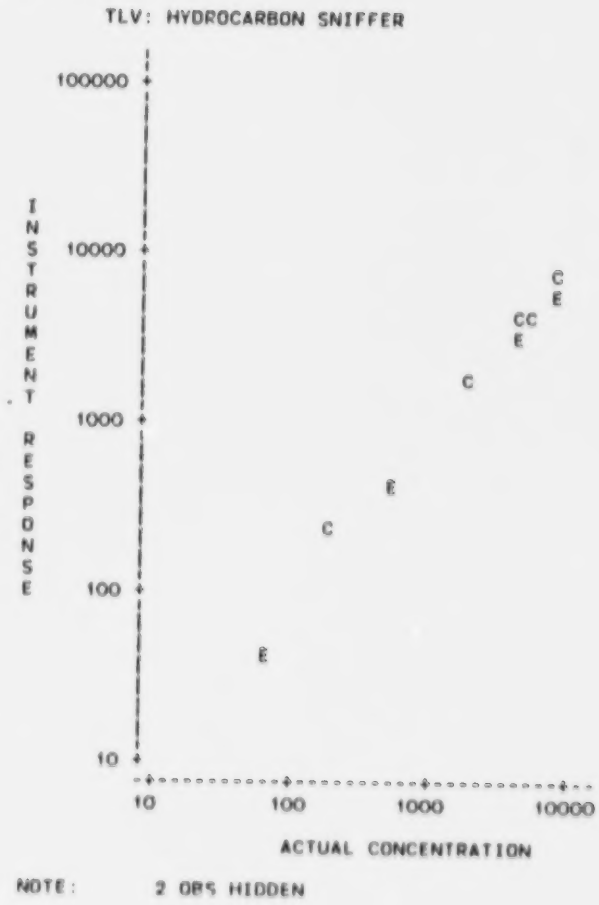


TABLE 5-119

RESPONSE FACTOR SUMMARY

METHYL FORMATE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	176	176	176	5.26	0.70	2	4.57		1	5.96		1						
1500	1419	1419	1419	4.13	0.36	2	3.77		1	4.49		1						
8000	11E3	11E3	11E3	3.51	0.23	2	3.29		1	3.74		1						
OVERALL MEANS				4.30	0.07	6	3.88	0.37	3	4.73	0.65	3						

ESTIMATED AT 10,000 PPMV 3.47

95 % CONFIDENCE INTERVAL : (2.87, 4.19)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	176	176	176	1.89	0.01	2	1.88		1	1.90		1						
1500	1419	1419	1419	1.79	0.02	2	1.81		1	1.77		1						
8000	11E3	11E3	11E3	1.98	0.10	2	2.09		1	1.88		1						
OVERALL MEANS				1.89	0.01	6	1.92	0.08	3	1.85	0.04	3						

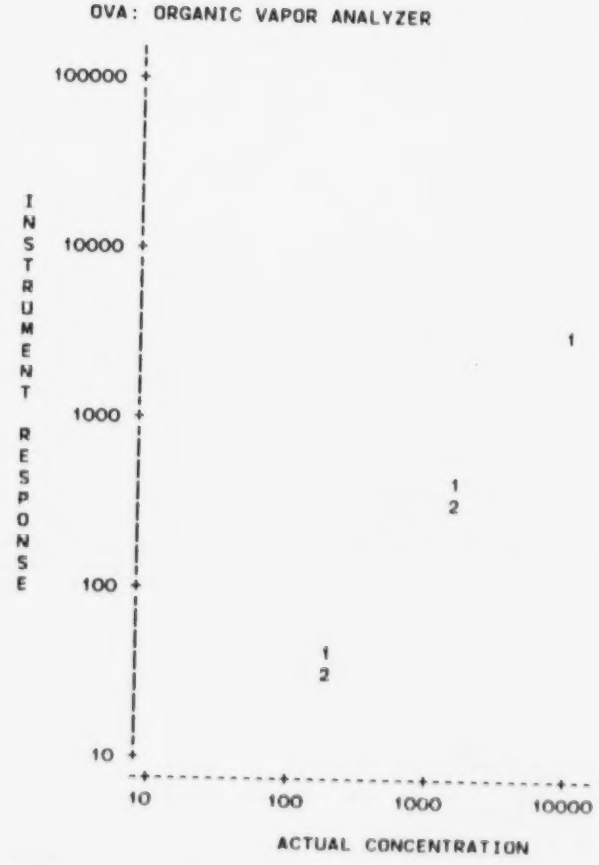
ESTIMATED AT 10,000 PPMV 1.93

95 % CONFIDENCE INTERVAL : (1.76, 2.11)

Figure 5-119

INSTRUMENT RESPONSE VS CONCENTRATION

METHYL FORMATE



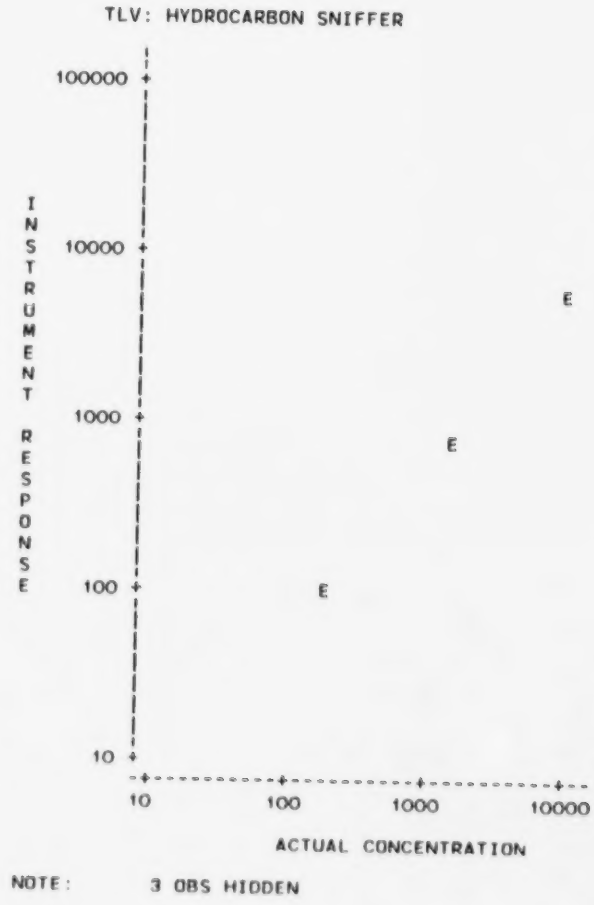


TABLE 5-120

RESPONSE FACTOR SUMMARY

METHYL METHACRYLATE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	212	212	212	2.13	0.11	2	2.02		1	2.23		1						
1500	1455	1455	1455	1.44	0.05	2	1.39		1	1.49		1						
8000	7776	7776	7776	1.05	0.06	2	0.98		1	1.11		1						
		OVERALL MEANS		1.54	0.01	6	1.47	0.30	3	1.61	0.33	3						

ESTIMATED AT 10,000 PPMV 0.99 95 % CONFIDENCE INTERVAL : (0.89, 1.10)

TLV INSTRUMENTS

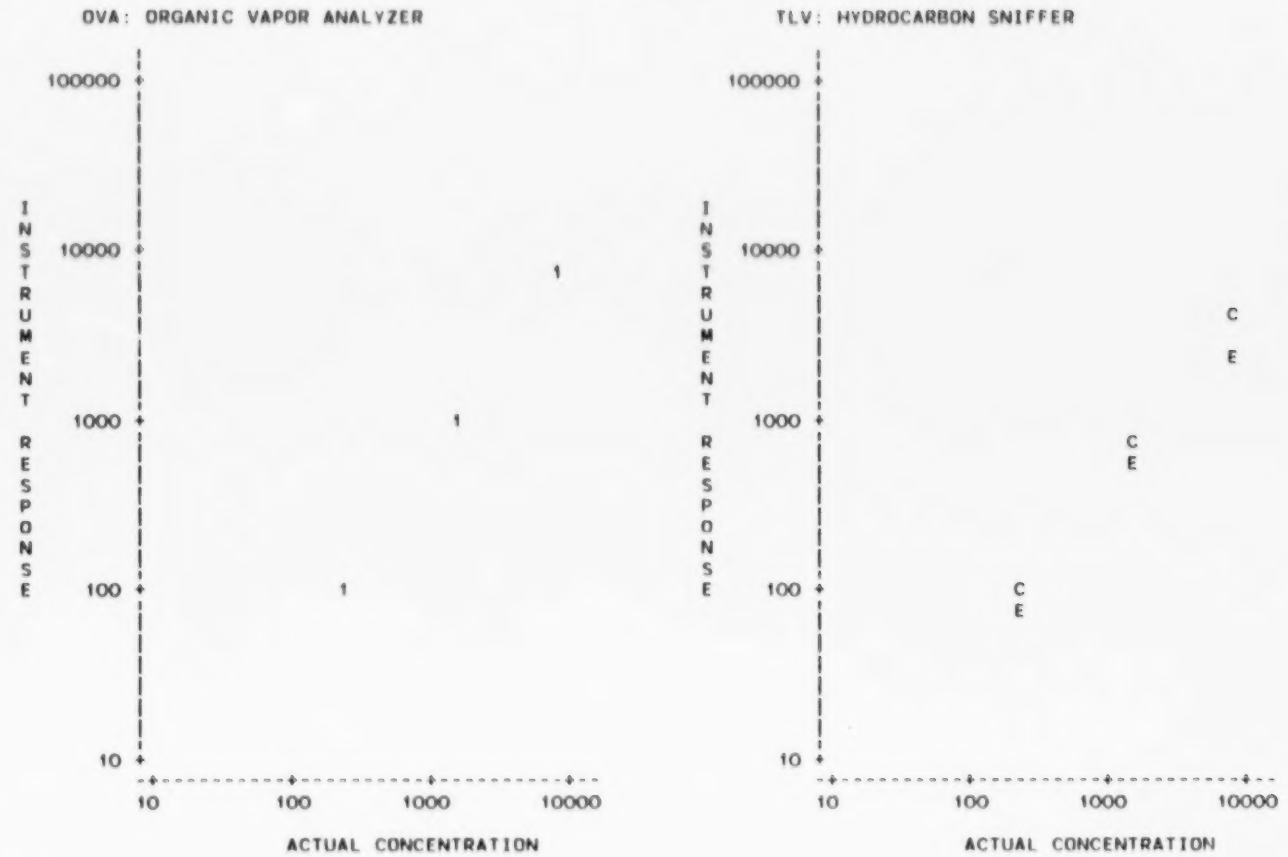
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	212	212	212	2.33	0.44	2	2.77		1	1.89		1						
1500	1455	1455	1455	2.07	0.35	2	2.42		1	1.73		1						
8000	7776	7776	7776	2.63	0.53	2	3.16		1	2.09		1						
		OVERALL MEANS		2.34	0.07	6	2.78	0.21	3	1.90	0.10	3						

ESTIMATED AT 10,000 PPMV 2.36 95 % CONFIDENCE INTERVAL : (1.54, 3.62)

Figure 5-120

INSTRUMENT RESPONSE VS CONCENTRATION

METHYL METHACRYLATE



NOTE: 3 OBS HIDDEN

TABLE 5-121

RESPONSE FACTOR SUMMARY

METHYL-2-PENTANOL,4-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	224	224	224	2.20	0.06	2	2.13		1	2.26		1						
1500	1460	1460	1460	1.59	0.04	2	1.54		1	1.63		1						
5000	5889	5889	5889	1.54	0.15	2	1.68		1	1.39		1						
8000	7636	7636	7636	2.19	0.00	2	2.18		1	2.19		1						
		OVERALL MEANS		1.88	0.00	8	1.89	0.15	4	1.87	0.21	4						

ESTIMATED AT 10,000 PPMV 1.70 95 % CONFIDENCE INTERVAL : (1.33, 2.17)

TLV INSTRUMENTS

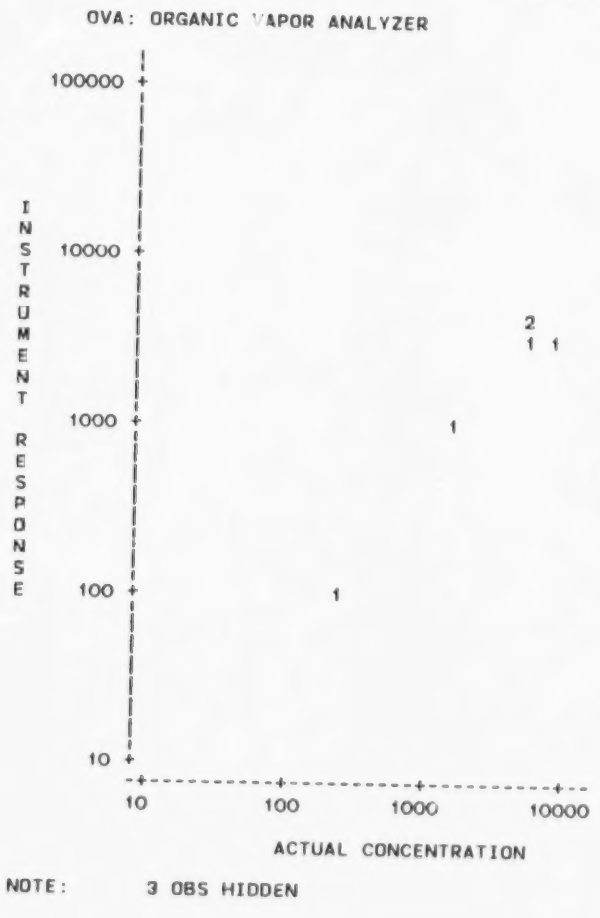
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	224	224	224	1.96	0.20	2	2.16		1	1.76		1						
1500	1460	1460	1460	1.40	0.13	2	1.27		1	1.53		1						
5000	5889	5889	5889	2.11	0.28	2	2.39		1	1.82		1						
8000	7636	7636	7636	2.16	0.22	2	2.38		1	1.94		1						
		OVERALL MEANS		1.91	0.02	8	2.05	0.27	4	1.76	0.09	4						

ESTIMATED AT 10,000 PPMV 1.94 95 % CONFIDENCE INTERVAL : (1.46, 2.58)

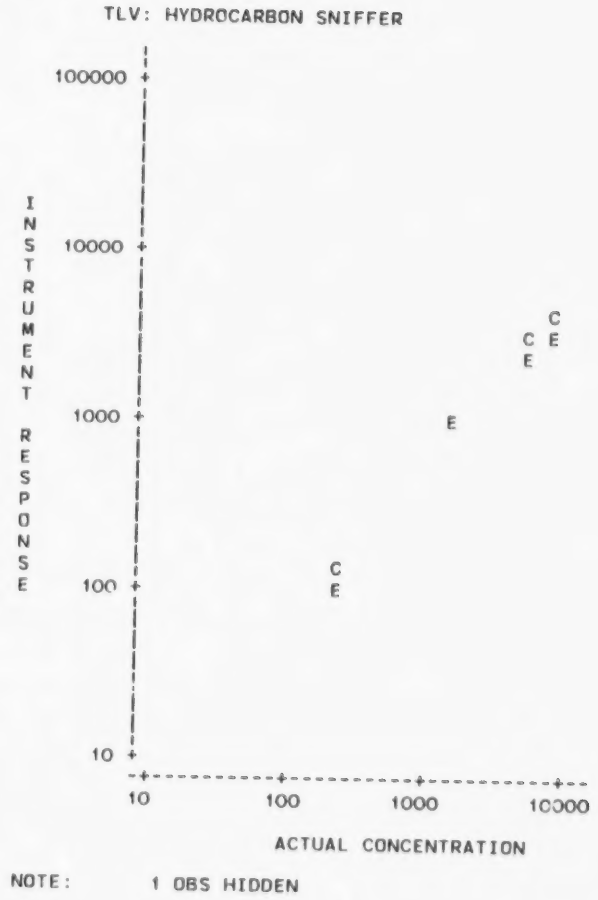
Figure 5-121

INSTRUMENT RESPONSE VS CONCENTRATION

METHYL-2-PENTANOL, 4-



NOTE: 3 OBS HIDDEN



NOTE: 1 OBS HIDDEN

TABLE 5-122

RESPONSE FACTOR SUMMARY

METHYL-2-PENTANONE,4-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	209	209	209	1.12	0.12	2	1.00		1	1.23		1						
1500	1510	1510	1510	0.85	0.05	2	0.80		1	0.89		1						
5000	4951	4951	4951	0.54	0.01	2	0.52		1	0.55		1						
6000	6268	6268	6268															
8000	7810	7810	7810															
OVERALL MEANS				0.83	0.01	6	0.77	0.14	3	0.89	0.20	3						

ESTIMATED AT 10,000 PPMV 0.49 95 % CONFIDENCE INTERVAL : (0.38, 0.64)

TLV INSTRUMENTS

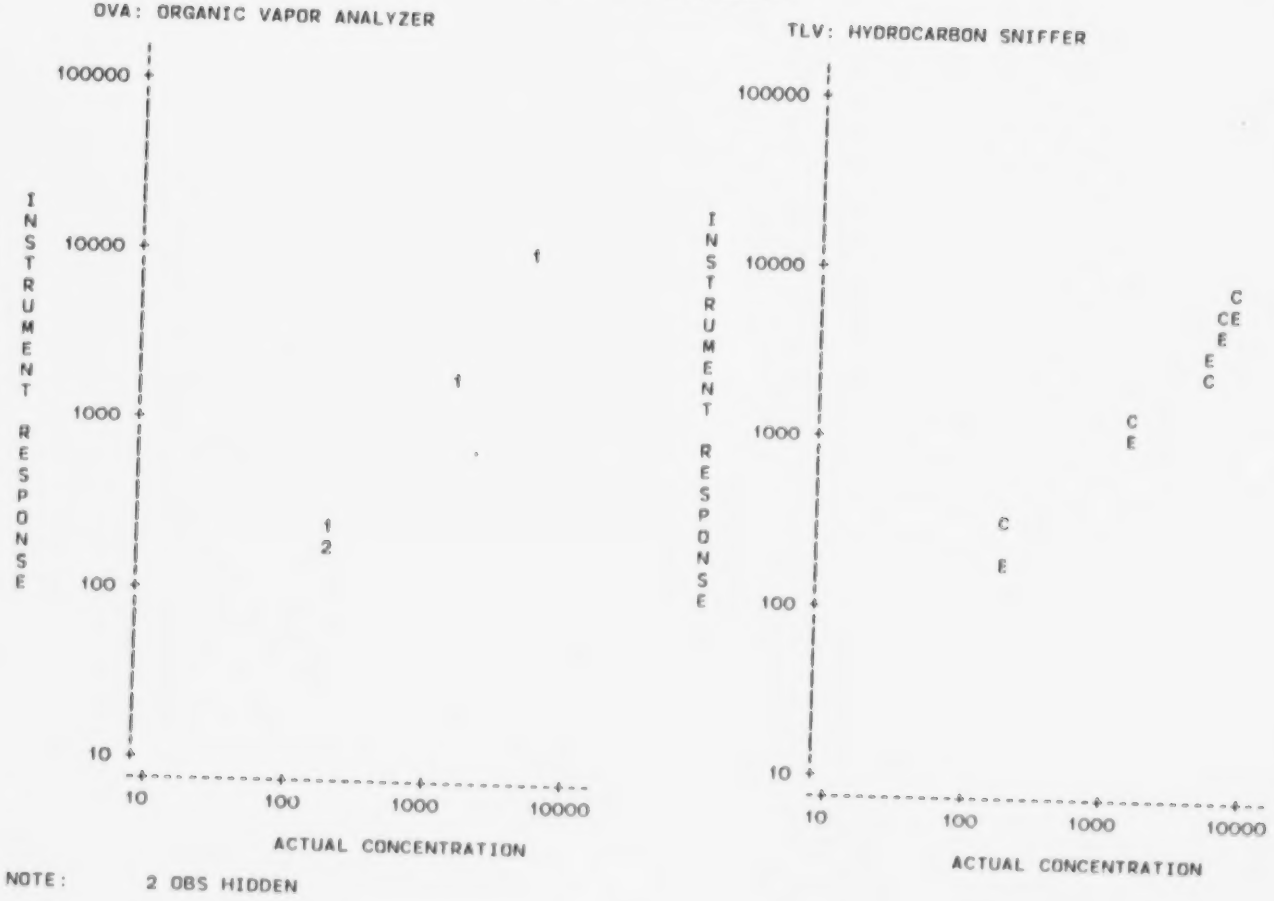
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	209	209	209	0.98	0.24	2	1.22		1	0.74		1						
1500	1510	1510	1510	1.34	0.25	2	1.59		1	1.10		1						
5000	4951	4951	4951	1.75	0.11	2	1.65		1	1.86		1						
6000	6268	6268	6268	1.44	0.20	2	1.64		1	1.24		1						
8000	7810	7810	7810	1.33	0.17	2	1.50		1	1.16		1						
OVERALL MEANS				1.37	0.01	10	1.52	0.08	5	1.22	0.18	5						

ESTIMATED AT 10,000 PPMV 1.54 95 % CONFIDENCE INTERVAL : (1.22, 1.94)

Figure 5-122

INSTRUMENT RESPONSE VS CONCENTRATION

METHYL-2-PENTANONE, 4-



NOTE: 2 OBS HIDDEN

TABLE 5-123

RESPONSE FACTOR SUMMARY

METHYL-2,4-PENTANEDIOL,2-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	225	225	225	14.78	0.24	2
1500	1661	1661	1661	50.50	3.06	2
8000	8362	8362	8362	80.81	1.17	2
OVERALL MEANS				48.70	0.22	6

ESTIMATED AT 10.000 PPMV 96.34

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
14.54		1	15.02		1						
53.57		1	47.44		1						
81.98		1	79.64		1						
50.03	19.6	3	47.37	18.7	3						

95 % CONFIDENCE INTERVAL : (72.63,127.8)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	225	225	225	6.26	1.24	2
1500	1661	1661	1661	31.85	6.12	2
8000	8362	8362	8362	57.85	16.7	2
OVERALL MEANS				31.99	1.34	6

ESTIMATED AT 10.000 PPMV 67.07

RESPONSE FACTORS

TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
7.49		1	5.02		1						
37.96		1	25.73		1						
74.60		1	41.11		1						
40.02	19.4	3	23.95	10.5	3						

95 % CONFIDENCE INTERVAL : (36.31,123.9)

Figure 5-123

INSTRUMENT RESPONSE VS CONCENTRATION

METHYL-2,4-PENTANEDIOL,2-

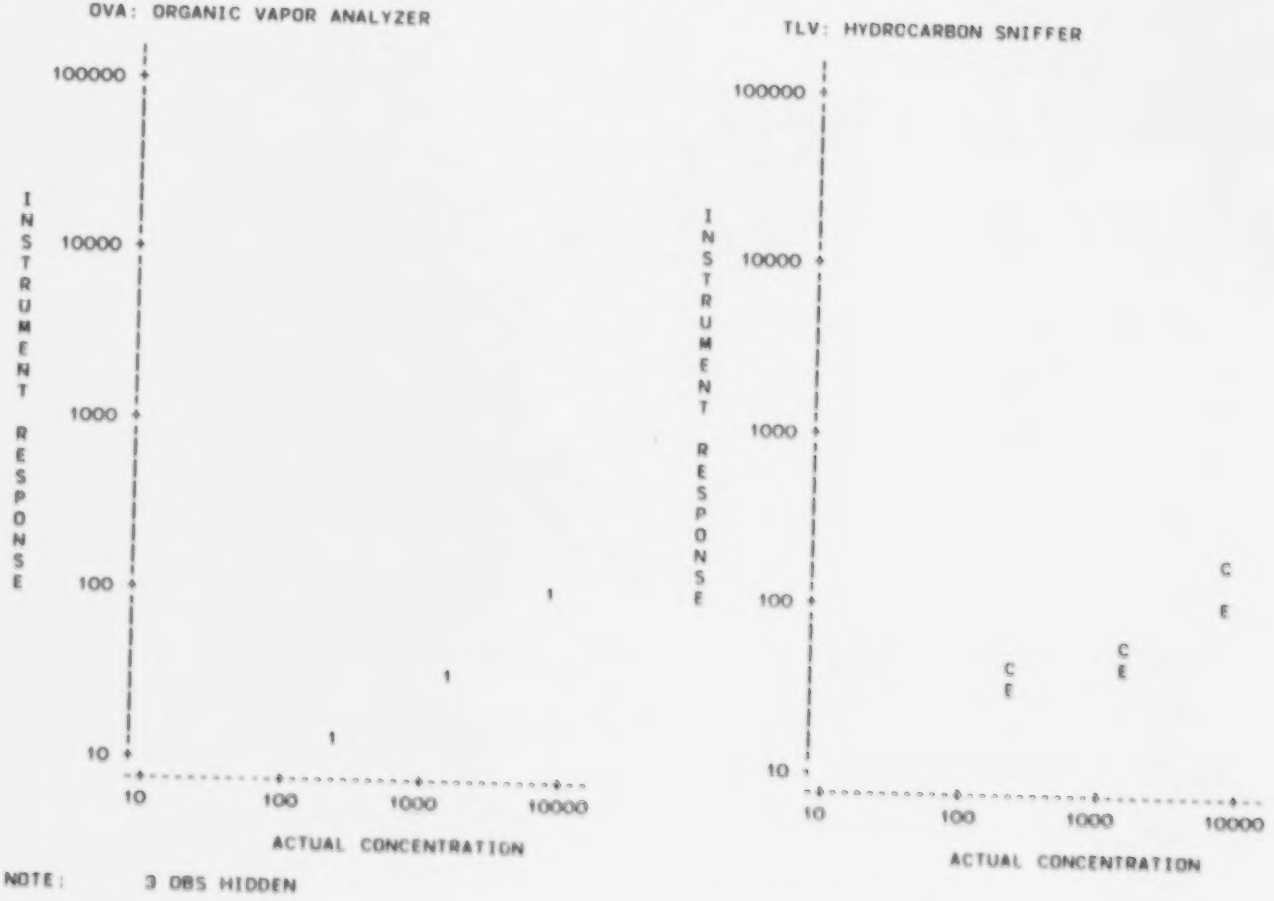


TABLE 5-124

RESPONSE FACTOR SUMMARY

METHYL-3-BUTYN-2-OL,2

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	209	209	209	1.40	0.14	2	1.26		1	1.55		1						
1500	1531	1531	1531	1.10	0.08	2	1.02		1	1.18		1						
5000	4914	4914	4914	0.55	0.06	2	0.49		1	0.61		1						
6000	6790	6790	6790															
8000	8175	8175	8175															
OVERALL MEANS				1.02	0.02	6	0.93	0.23	3	1.12	0.27	3						

ESTIMATED AT 10,000 PPMV 0.51

95 % CONFIDENCE INTERVAL : (0.32, 0.79)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	209	209	209															
1500	1531	1531	1531															
5000	4914	4914	4914															
6000	6790	6790	6790															
8000	8175	8175	8175															
OVERALL MEANS																		

ESTIMATED AT 10,000 PPMV

95 % CONFIDENCE INTERVAL : (.)

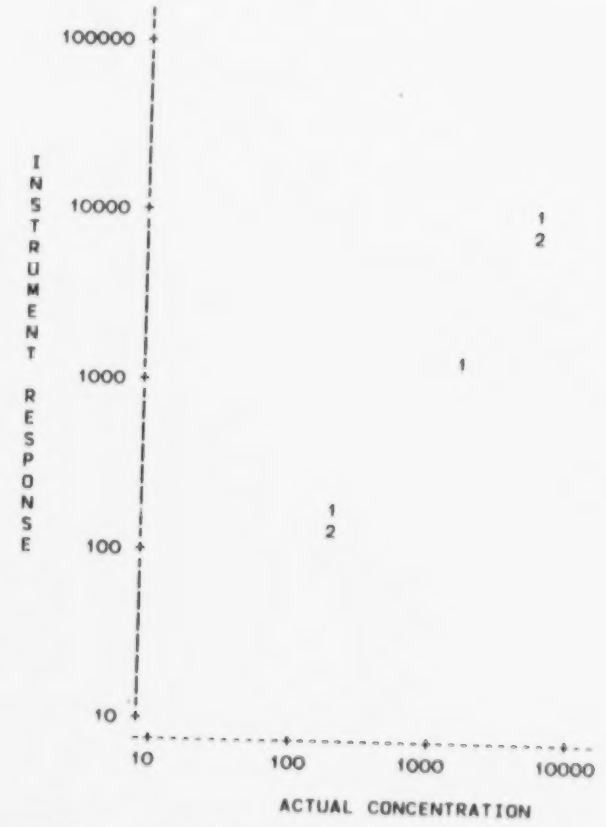
Figure 5-124

INSTRUMENT RESPONSE VS CONCENTRATION

METHYL-3-BUTYN-2-OL,2

OVA: ORGANIC VAPOR ANALYZER

TLV: HYDROCARBON SNIFFER



NOTE: 1 OBS HIDDEN

TABLE 5-125

RESPONSE FACTOR SUMMARY

METHYLAL

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	44	57	51	4.33	1.06	4	3.27	0.82	2	5.39	0.97	2						
500	529	531	530	3.10	0.46	4	2.64	0.47	2	3.56	0.22	2						
8000	8399	8500	8450	1.49	0.15	4	1.35	0.06	2	1.64	0.01	2						
			OVERALL MEANS	2.97	0.05	12	2.42	0.43	6	3.53	0.73	6						

ESTIMATED AT 10,000 PPMV 1.46

95 % CONFIDENCE INTERVAL : (1.09, 1.96)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
50	44	57	51	0.92	0.04	4	0.96	0.11	2	0.87	0.17	2						
500	529	531	530	1.14	0.09	4	1.22	0.01	2	1.05	0.00	2						
8000	8399	8500	8450	1.40	0.08	4	1.48	0.11	2	1.31	0.11	2						
			OVERALL MEANS	1.15	0.01	12	1.22	0.10	6	1.08	0.10	6						

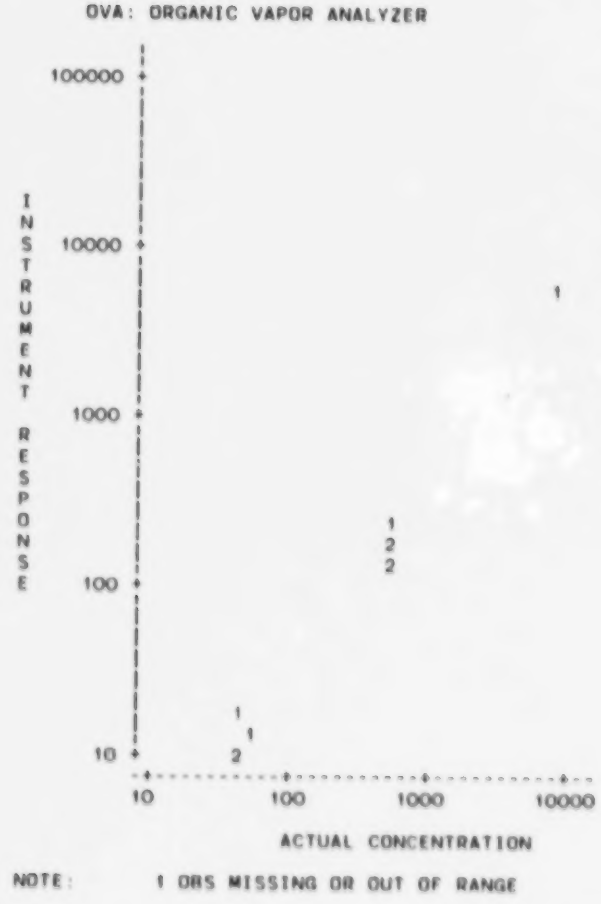
ESTIMATED AT 10,000 PPMV 1.41

95 % CONFIDENCE INTERVAL : (1.23, 1.62)

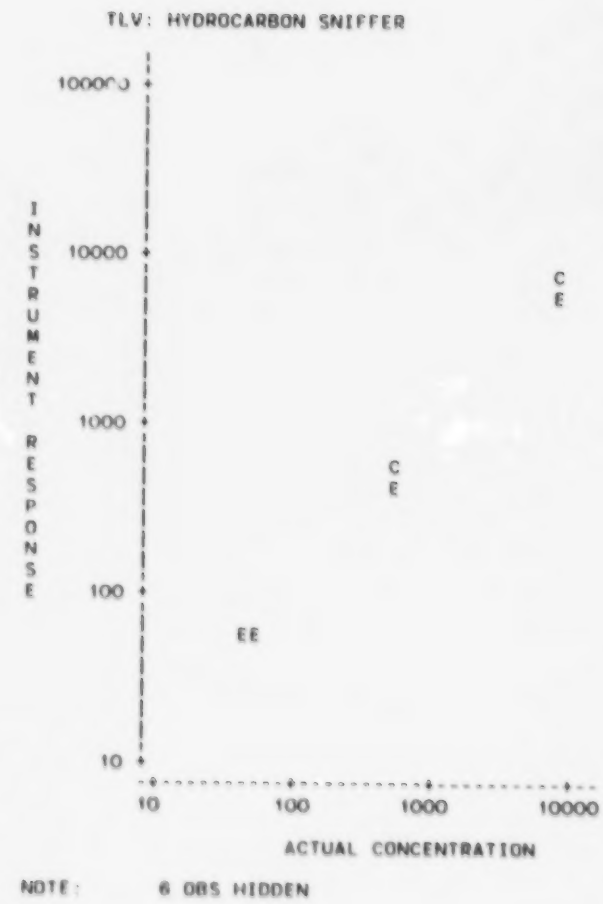
Figure 5-125

INSTRUMENT RESPONSE VS CONCENTRATION

METHYLAL



NOTE: 1 OBS MISSING OR OUT OF RANGE



NOTE: 6 OBS HIDDEN

TABLE 5-126

RESPONSE FACTOR SUMMARY

METHYLANILINE,N-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	194	194	194	3.05	0.02	2	3.03		1	3.08		1						
650	664	664	664	3.35	0.09	2	3.26		1	3.44		1						
1100	1075	1075	1075	3.48	0.05	2	3.54		1	3.43		1						
			OVERALL MEANS	3.30	0.00	6	3.27	0.15	3	3.32	0.12	3						

ESTIMATED AT 10,000 PPMV 4.13 95 % CONFIDENCE INTERVAL : (3.75, 4.54)

TLV INSTRUMENTS

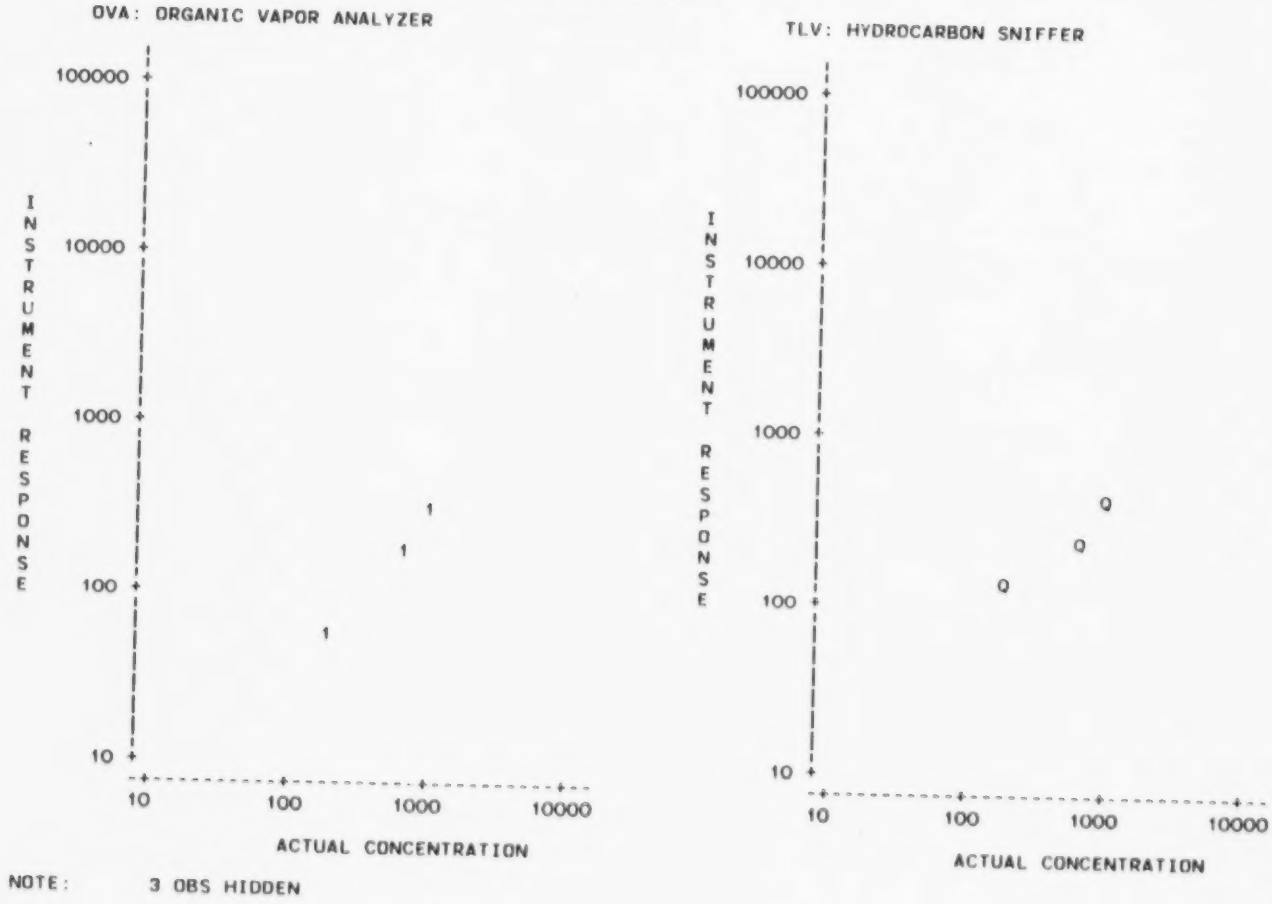
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	194	194	194	1.34		1										1.34		1
650	664	664	664	2.53		1										2.53		1
1100	1075	1075	1075	2.23		1										2.23		1
			OVERALL MEANS	2.03		3										2.03	0.36	3

ESTIMATED AT 10,000 PPMV 5.25 95 % CONFIDENCE INTERVAL : (0.99,27.84)

Figure 5-126

INSTRUMENT RESPONSE VS CONCENTRATION

METHYLANILINE,N-



NOTE: 3 OBS HIDDEN

TABLE 5-127

RESPONSE FACTOR SUMMARY

METHYLCYCLOHEXANE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	201	201	201	1.45	0.08	2	1.37		1	1.54		1						
1500	1498	1498	1498	1.43	0.00	2	1.43		1	1.43		1						
3000	3000	3000	3000	0.43	0.00	2	0.43		1	0.44		1						
5000	5399	5399	5399															
8000	7786	7786	7786															
		OVERALL MEANS		1.11	0.00	6	1.08	0.32	3	1.13	0.35	3						

ESTIMATED AT 10,000 PPMV 0.38 95 % CONFIDENCE INTERVAL : (0.12, 1.16)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	201	201	201	0.73	0.06	2	0.80		1	0.67		1						
1500	1498	1498	1498	1.18	0.03	2	1.22		1	1.15		1						
3000	3000	3000	3000	0.74	0.05	2	0.78		1	0.69		1						
5000	5399	5399	5399	0.89	0.02	2	0.91		1	0.86		1						
8000	7786	7786	7786	0.77	0.00	2	0.77		1	0.78		1						
		OVERALL MEANS		0.86	0.00	10	0.89	0.08	5	0.83	0.09	5						

ESTIMATED AT 10,000 PPMV 0.85 95 % CONFIDENCE INTERVAL : (0.67, 1.07)

Figure 5-127

INSTRUMENT RESPONSE VS CONCENTRATION

METHYLCYCLOHEXANE

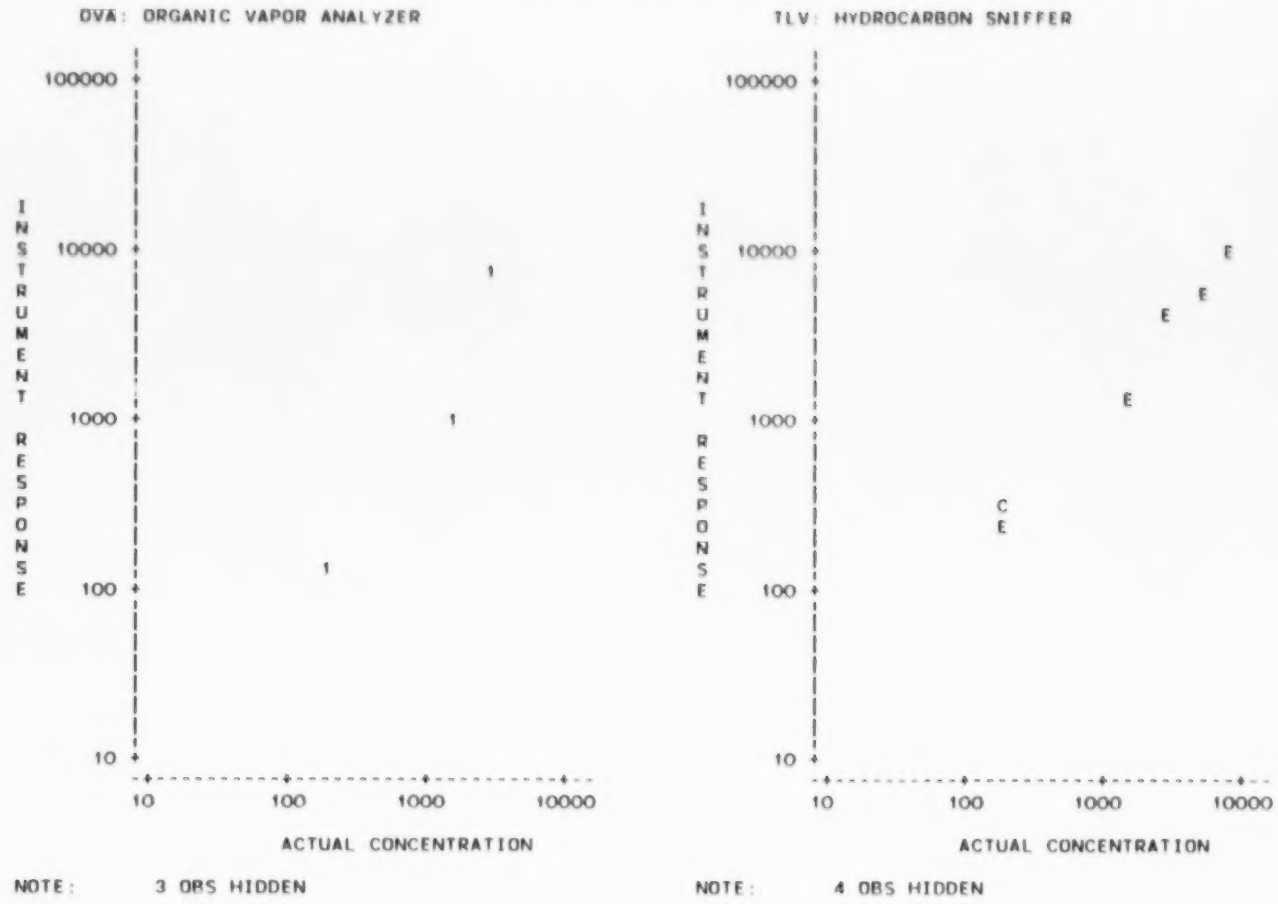


TABLE 5-128

RESPONSE FACTOR SUMMARY

METHYLCYCLOHEXENE, 1-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	208	208	208	1.22	0.04	2	1.18		1	1.26		1						
1500	1547	1547	1547	0.76	0.02	2	0.74		1	0.78		1						
4000	3890	3890	3890	0.41	0.01	2	0.40		1	0.42		1						
6000	5668	5668	5668															
8000	8540	8540	8540															
OVERALL MEANS				0.80	0.00	6	0.77	0.23	3	0.82	0.24	3						

ESTIMATED AT 10,000 PPMV 0.33

95 % CONFIDENCE INTERVAL : (0.24, 0.45)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	208	208	208	0.99	0.08	2							1.07		1	0.90		1
1500	1547	1547	1547	1.46	0.07	2							1.53		1	1.39		1
4000	3890	3890	3890	2.26	0.98	2							3.23		1	1.28		1
6000	5668	5668	5668	1.97	0.28	2							2.25		1	1.69		1
8000	8540	8540	8540	2.19	0.07	2							2.13		1	2.26		1
OVERALL MEANS				1.77	0.03	10							2.04	0.37	5	1.50	0.23	5

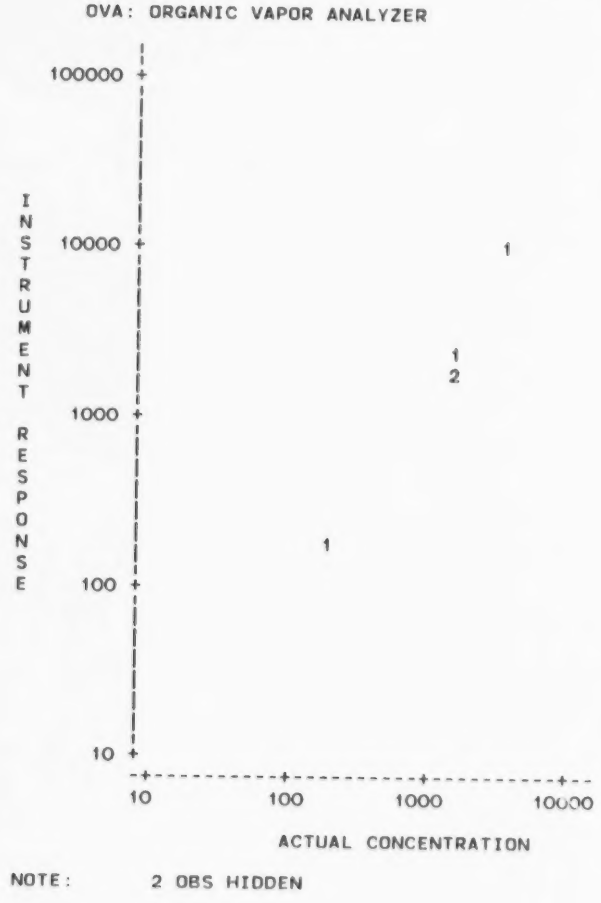
ESTIMATED AT 10,000 PPMV 2.22

95 % CONFIDENCE INTERVAL : (1.70, 2.91)

Figure 5-128

INSTRUMENT RESPONSE VS CONCENTRATION

METHYLCYCLOHEXENE, 1-



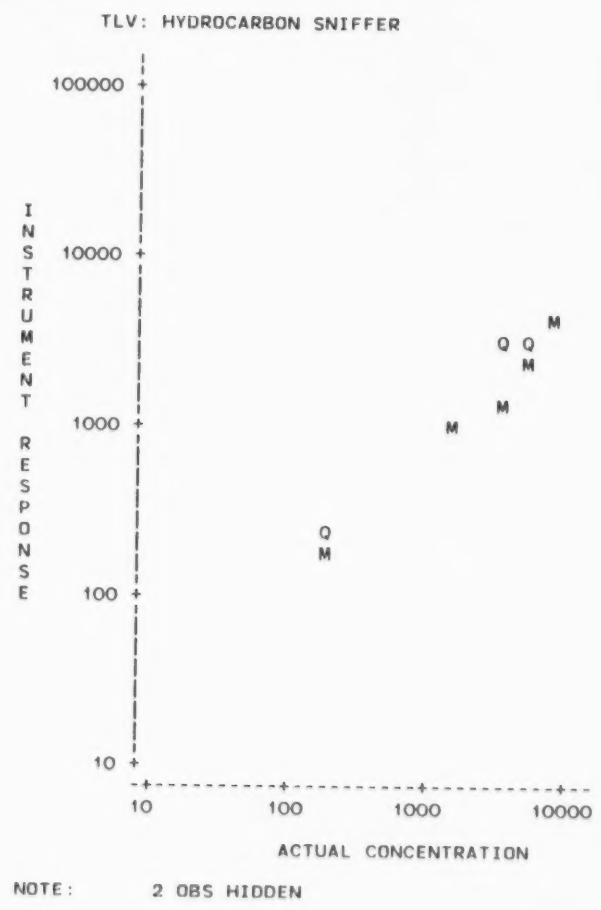


TABLE 5-129

RESPONSE FACTOR SUMMARY

METHYLPENTYNOL

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	215	215	215	1.34	0.05	2	1.30		1	1.39		1						
1500	1487	1487	1487	0.85	0.02	2	0.88		1	0.83		1						
7000	7413	7413	7413	1.46	0.03	2	1.48		1	1.43		1						
		OVERALL MEANS		1.22	0.00	6	1.22	0.18	3	1.21	0.19	3						

ESTIMATED AT 10,000 PPMV 1.17 95 % CONFIDENCE INTERVAL : (0.71, 1.92)

TLV INSTRUMENTS

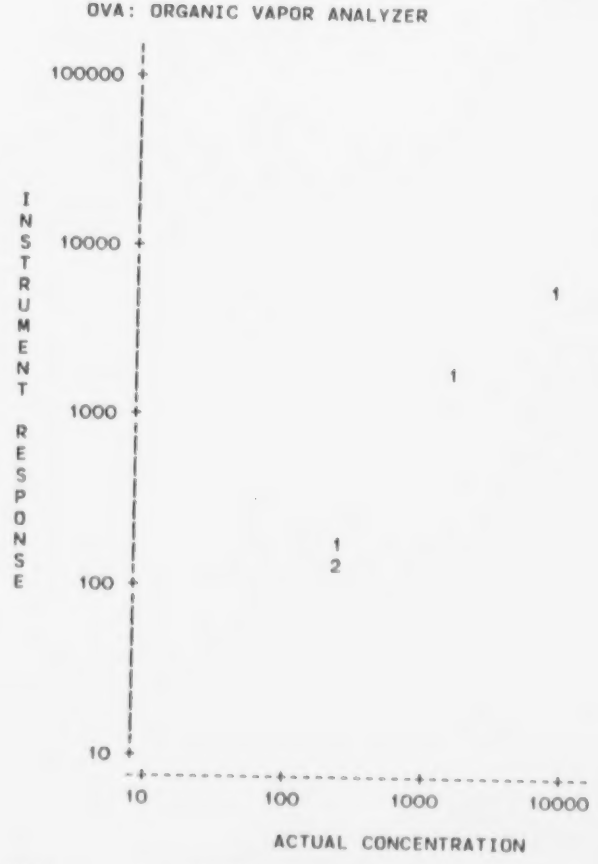
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	215	215	215	1.67	0.04	2							1.71		1	1.63		1
1500	1487	1487	1487	1.98	0.47	2							2.45		1	1.51		1
7000	7413	7413	7413	2.96	0.44	2							3.40		1	2.52		1
		OVERALL MEANS		2.20	0.05	6							2.52	0.49	3	1.89	0.32	3

ESTIMATED AT 10,000 PPMV 2.82 95 % CONFIDENCE INTERVAL : (1.92, 4.14)

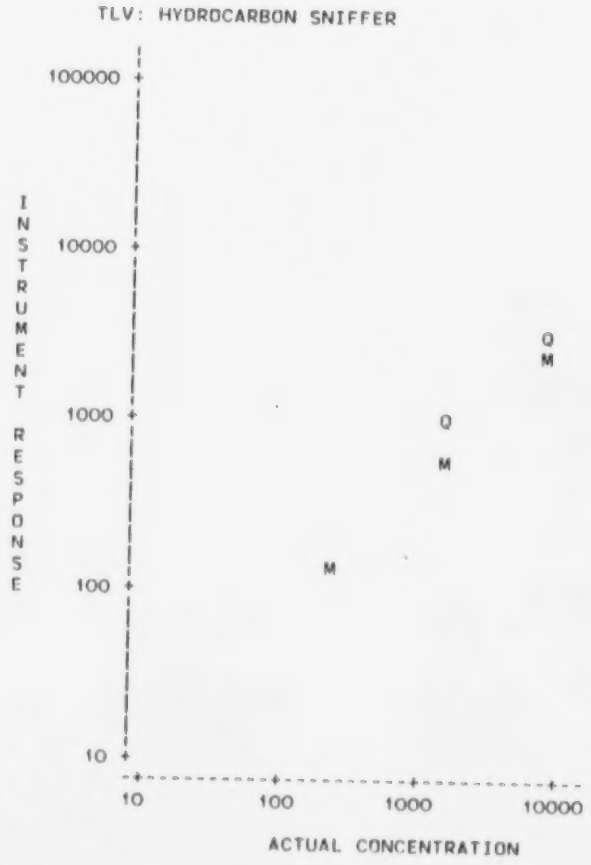
Figure 5-129

INSTRUMENT RESPONSE VS CONCENTRATION

METHYLPENTYNOL



NOTE: 2 OBS HIDDEN



NOTE: 1 OBS HIDDEN

TABLE 5-130

RESPONSE FACTOR SUMMARY

METHYLSTYRENE, A-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
50	31	56	43	6.18	0.49	4
500	534	549	542	6.39	0.28	4
5000	5618	5618	5618	12.27	0.92	2
8000	8817	8896	8856	10.41	0.06	4
			OVERALL MEANS	8.32	0.01	14

ESTIMATED AT 10,000 PPMV 10.24

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
5.69	0.50	2	6.67	1.11	2						
6.11	1.11	2	6.67	2.09	2						
13.19		1	11.35		1						
10.47	0.03	2	10.35	0.48	2						
8.25	1.19	7	8.39	0.97	7						

95 % CONFIDENCE INTERVAL : (8.30,12.63)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
50	31	56	43	1.58	0.22	4
500	534	549	542	12.47	2.41	4
5000	5618	5618	5618	63.15	39.6	2
8000	8817	8896	8856	37.33	24	4
			OVERALL MEANS	23.70	0.95	14

ESTIMATED AT 10,000 PPMV 31.46

RESPONSE FACTORS

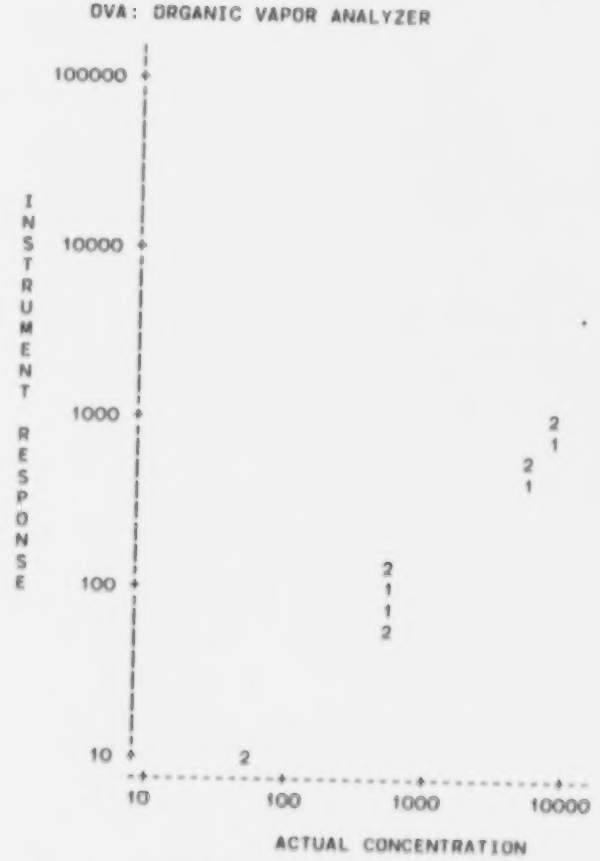
TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
1.80	0.48	2	1.37	0.48	2						
14.88	6.84	2	10.06	4.04	2						
102.7		1	23.56		1						
61.30	19.3	2	13.36	0.13	2						
36.96	15.3	7	10.45	3.04	7						

95 % CONFIDENCE INTERVAL : (16.08,61.53)

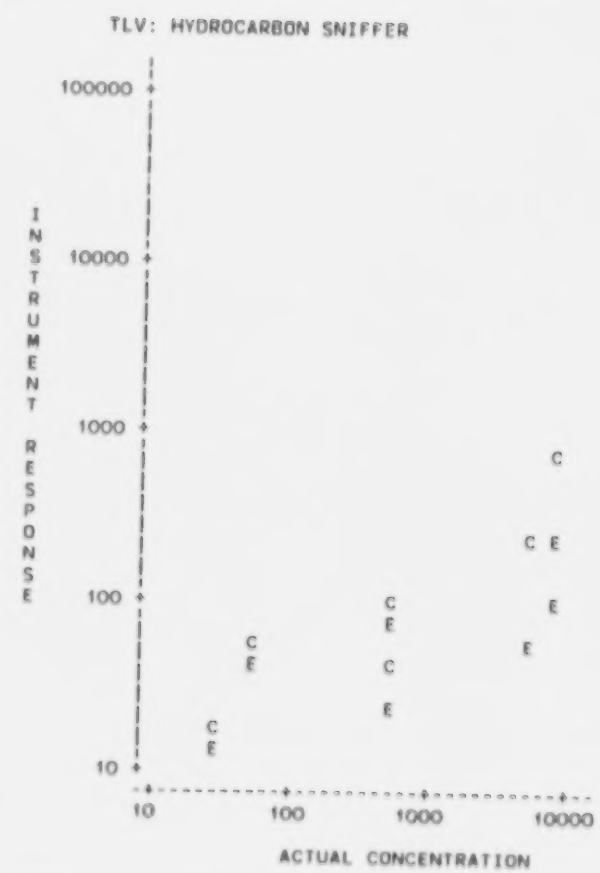
Figure 5-130

INSTRUMENT RESPONSE VS CONCENTRATION

METHYLSTYRENE, A-



NOTE: 3 OBS MISSING OR OUT OF RANGE



NOTE: 1 OBS HIDDEN

TABLE 5-131

RESPONSE FACTOR SUMMARY

MONOETHANOLAMINE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N
100	92	92	92	39.74	21.4	2
200	198	198	198	10.77	2.86	2
400	425	425	425	26.35	3.99	2
1500	1574	1574	1574	137.6	47.6	2
6000	6024	6024	6024	21.77	5.49	2
			OVERALL MEANS	47.24	0.61	10

ESTIMATED AT 10,000 PPMV 28.04

RESPONSE FACTORS

OVA METERS											
1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
						61.14		1	18.34		1
						7.91		1	13.63		1
						30.34		1	22.36		1
						89.94		1	185.2		1
						16.28		1	27.26		1
						41.12	15.2	5	53.35	33	5

95 % CONFIDENCE INTERVAL : (6.39, 123)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N
100	92	92	92	0.67		1
200	198	198	198	1.10		1
400	425	425	425	3.03		1
1500	1574	1574	1574	9.26		1
6000	6024	6024	6024	13.85		1
			OVERALL MEANS	5.58		5

ESTIMATED AT 10,000 PPMV 25.83

RESPONSE FACTORS

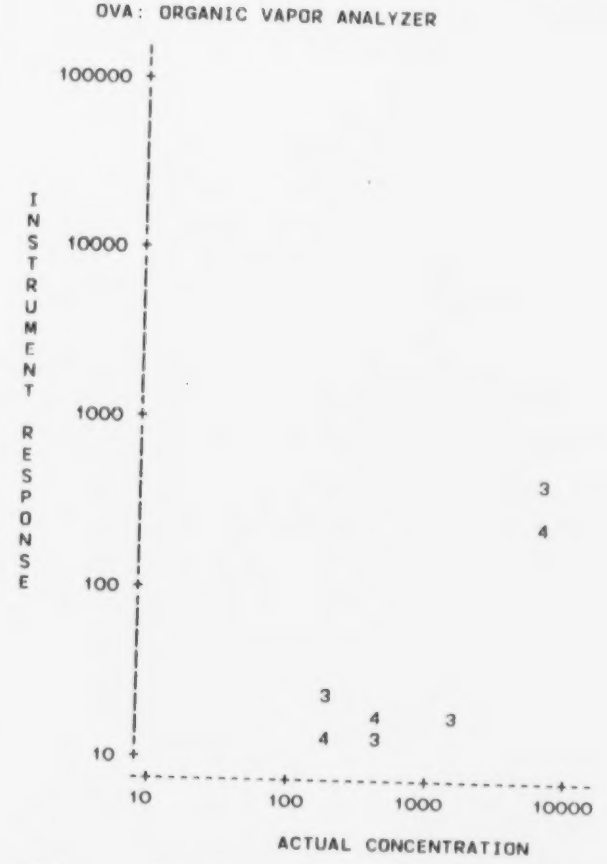
TLV METERS											
7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
			0.67		1						
			1.10		1						
			3.03		1						
			9.26		1						
			13.85		1						
			5.58	2.57	5						

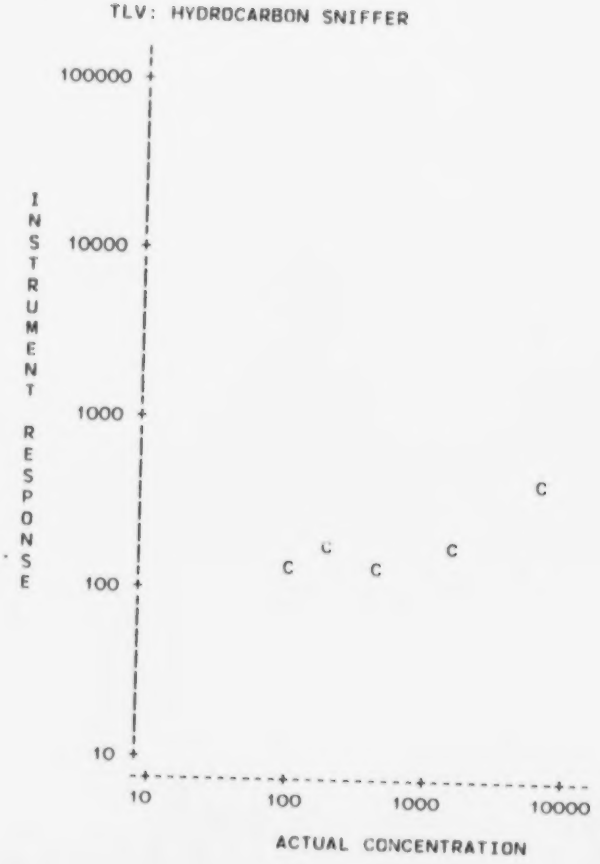
95 % CONFIDENCE INTERVAL : (11.82,56.44)

Figure 5-131

INSTRUMENT RESPONSE VS CONCENTRATION

MONOETHANOLAMINE





NOTE: 3 OBS HAD MISSING VALUES OR WERE OU

TABLE 5-132

RESPONSE FACTOR SUMMARY

MORPHOLINE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	197	197	197	1.31	0.13	2
1500	1519	1519	1519	1.45	0.12	2
8000	7574	7574	7574	0.85	0.01	2
			OVERALL MEANS	1.20	0.01	6
			ESTIMATED AT 10,000 PPMV	0.92		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
						1.18		1	1.45		1
						1.33		1	1.56		1
						0.84		1	0.87		1
						1.12	0.14	3	1.29	0.22	3

95 % CONFIDENCE INTERVAL : (0.64, 1.32)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	197	197	197	1.09		1
1500	1519	1519	1519	2.71		1
8000	7574	7574	7574	1.68		1
			OVERALL MEANS	1.83		3
			ESTIMATED AT 10,000 PPMV	1.93		

RESPONSE FACTORS

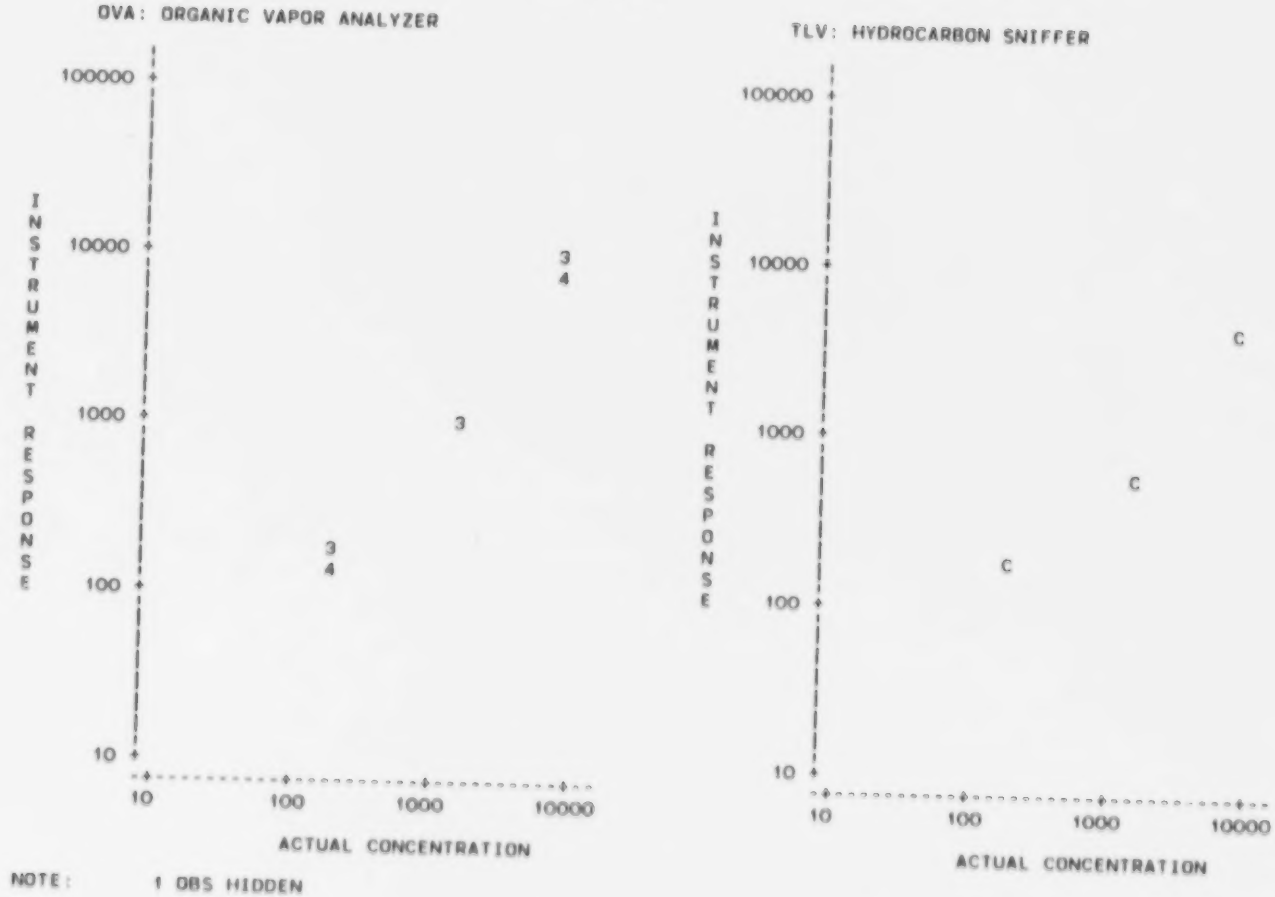
TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
			1.09		1						
			2.71		1						
			1.68		1						
			1.83	0.47	3						

95 % CONFIDENCE INTERVAL : (0.36, 10.40)

Figure 5-132

INSTRUMENT RESPONSE VS CONCENTRATION

MORPHOLINE



NOTE: 1 OBS HIDDEN

TABLE 5-133

RESPONSE FACTOR SUMMARY

NITROBENZENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
100	103	103	103	1.26	0.21	2							1.05		1	1.48		1
200	201	201	201	1.02		1							1.02		1			
600	485	485	485	4.49		1							4.49		1			
1000	920	920	920	5.32		1							5.32		1			
		OVERALL MEANS		2.67	0.12	5							2.97	1.13	4	1.48		1

ESTIMATED AT 10,000 PPMV 29.77 95 % CONFIDENCE INTERVAL : (3.92, 226)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
100	103	103	103	0.47		1				0.47		1						
200	201	201	201	0.48		1				0.48		1						
600	485	485	485	2.09		1				2.09		1						
1000	920	920	920	3.72		1				3.72		1						
		OVERALL MEANS		1.69		4				1.69	0.78	4						

ESTIMATED AT 10,000 PPMV 40.61 95 % CONFIDENCE INTERVAL : (4.68,352.7)

Figure 5-133

INSTRUMENT RESPONSE VS CONCENTRATION

NITROBENZENE

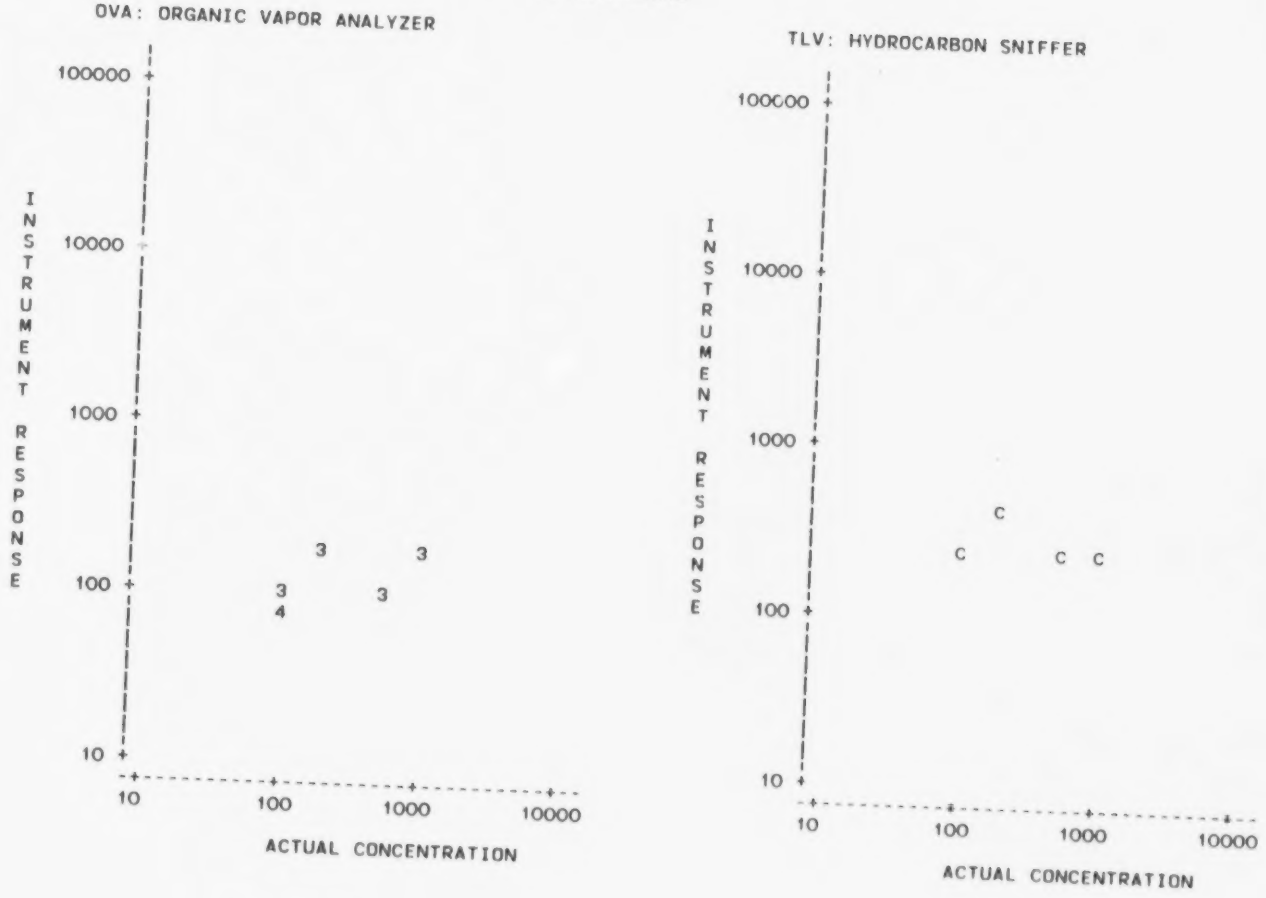


TABLE 5-134

RESPONSE FACTOR SUMMARY

NITROETHANE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	188	188	188	1.40	0.10	2	1.50		1	1.29		1						
1500	1502	1502	1502	1.51	0.00	2	1.52		1	1.51		1						
8000	7961	7961	7961	1.36	0.01	2	1.35		1	1.36		1						
		OVERALL MEANS		1.42	0.01	6	1.46	0.05	3	1.39	0.06	3						

ESTIMATED AT 10,000 PPMV 1.40 95 % CONFIDENCE INTERVAL : (1.23, 1.59)

TLV INSTRUMENTS

RESPONSE FACTORS

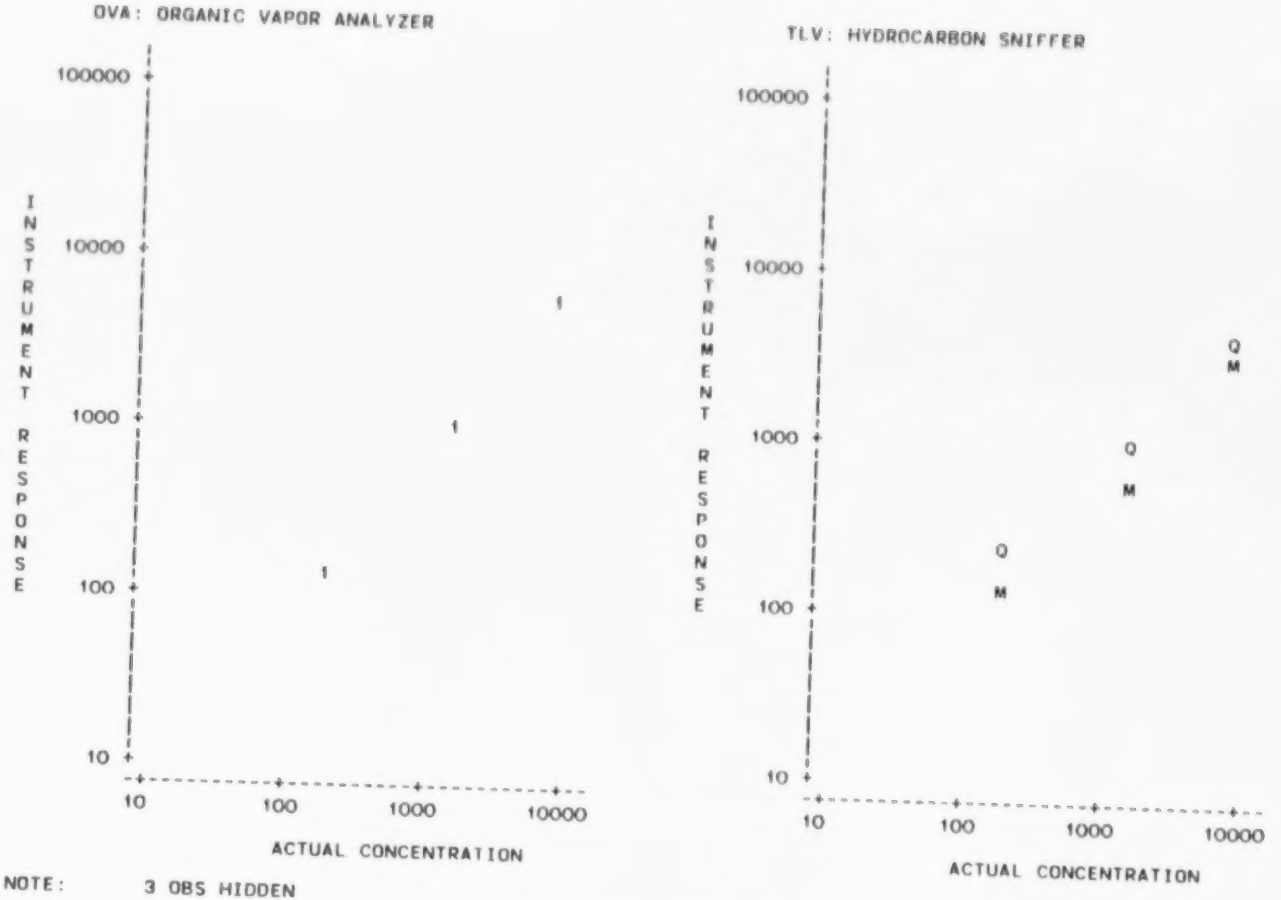
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	188	188	188	0.98	0.23	2							1.21		1	0.74		1
1500	1502	1502	1502	1.88	0.48	2							2.36		1	1.40		1
8000	7961	7961	7961	2.39	0.28	2							2.67		1	2.11		1
		OVERALL MEANS		1.75	0.06	6							2.08	0.44	3	1.42	0.39	3

ESTIMATED AT 10,000 PPMV 2.54 95 % CONFIDENCE INTERVAL : (1.60, 4.04)

Figure 5-134

INSTRUMENT RESPONSE VS CONCENTRATION

NITROETHANE



NOTE: 3 OBS HIDDEN

TABLE 5-135

RESPONSE FACTOR SUMMARY

NITROMETHANE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	221	221	221	2.84	0.07	2
1500	1537	1537	1537	2.95	0.14	2
8000	8740	8740	8740	3.37	0.13	2
			OVERALL MEANS	3.06	0.02	6
			ESTIMATED AT 10,000 PPMV	3.32		

RESPONSE FACTORS

OVA METERS

1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
2.77		1	2.91		1						
2.81		1	3.10		1						
3.24		1	3.50		1						
2.94	0.15	3	3.17	0.17	3						

95 % CONFIDENCE INTERVAL : (3.03, 3.64)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	221	221	221	3.44	1.79	2
1500	1537	1537	1537	4.51	1.32	2
8000	8740	8740	8740	5.95	1.57	2
			OVERALL MEANS	4.63	0.26	6
			ESTIMATED AT 10,000 PPMV	5.25		

RESPONSE FACTORS

TLV METERS

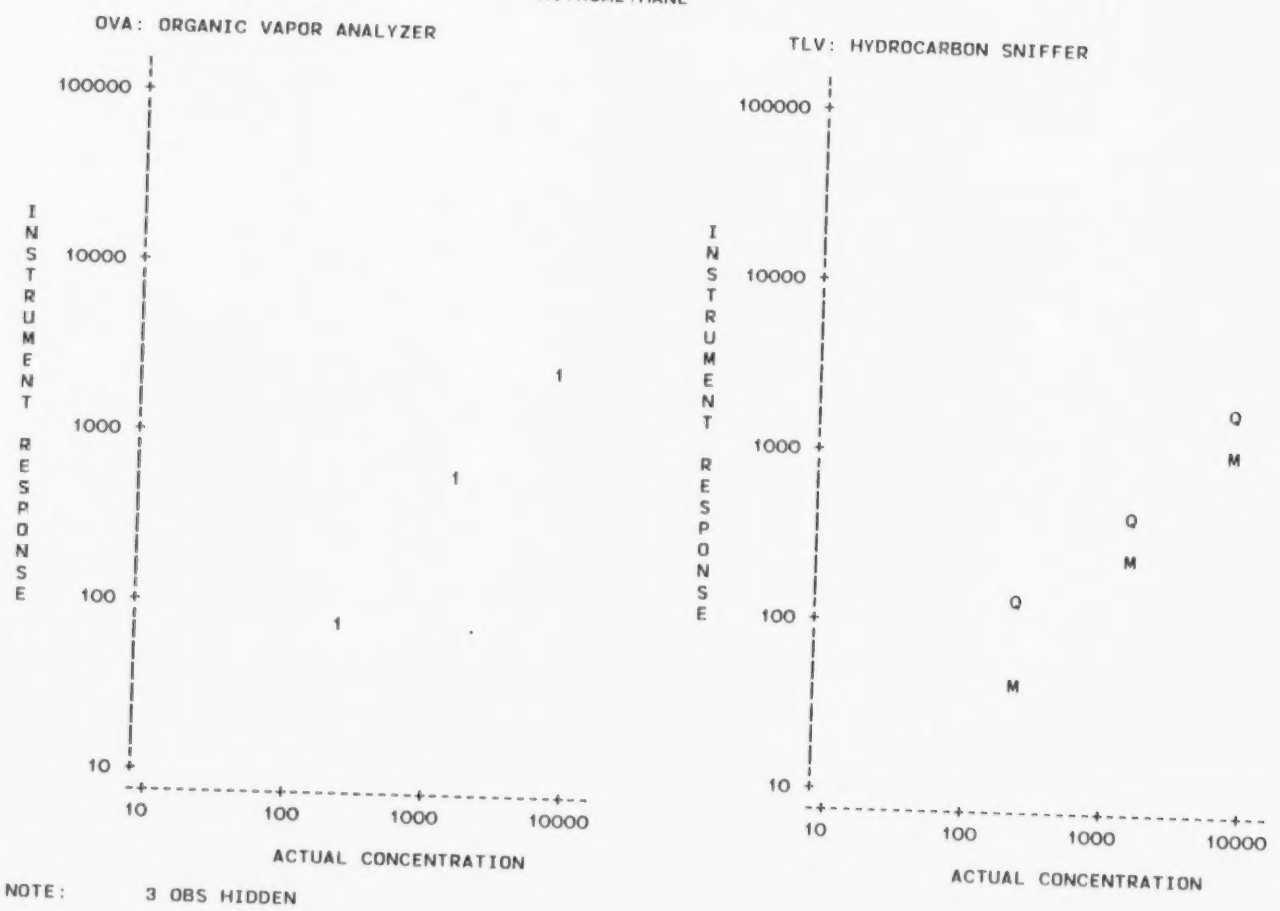
7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
						5.22		1	1.65		1
						5.83		1	3.18		1
						7.51		1	4.38		1
						6.19	0.69	3	3.07	0.79	3

95 % CONFIDENCE INTERVAL : (2.32,11.86)

Figure 5-135

INSTRUMENT RESPONSE VS CONCENTRATION

NITROMETHANE



NOTE: 3 OBS HIDDEN

TABLE 5-136

RESPONSE FACTOR SUMMARY

NITROPROPANE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS: 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	217	217	217	1.51	0.21	2	1.31		1	1.72		1						
1500	1564	1564	1564	1.53	0.04	2	1.49		1	1.57		1						
8000	8565	8565	8565	1.01	0.09	2	0.92		1	1.10		1						
		OVERALL MEANS		1.35	0.02	6	1.24	0.17	3	1.46	0.19	3						

ESTIMATED AT 10,000 PPMV 1.06

95 % CONFIDENCE INTERVAL : (0.79, 1.42)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS: 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	217	217	217	0.90	0.21	2							1.11		1	0.69		1
1500	1564	1564	1564	1.32	0.27	2							1.59		1	1.05		1
8000	8565	8565	8565	1.75	0.09	2							1.85		1	1.66		1
		OVERALL MEANS		1.32	0.03	6							1.51	0.21	3	1.13	0.29	3

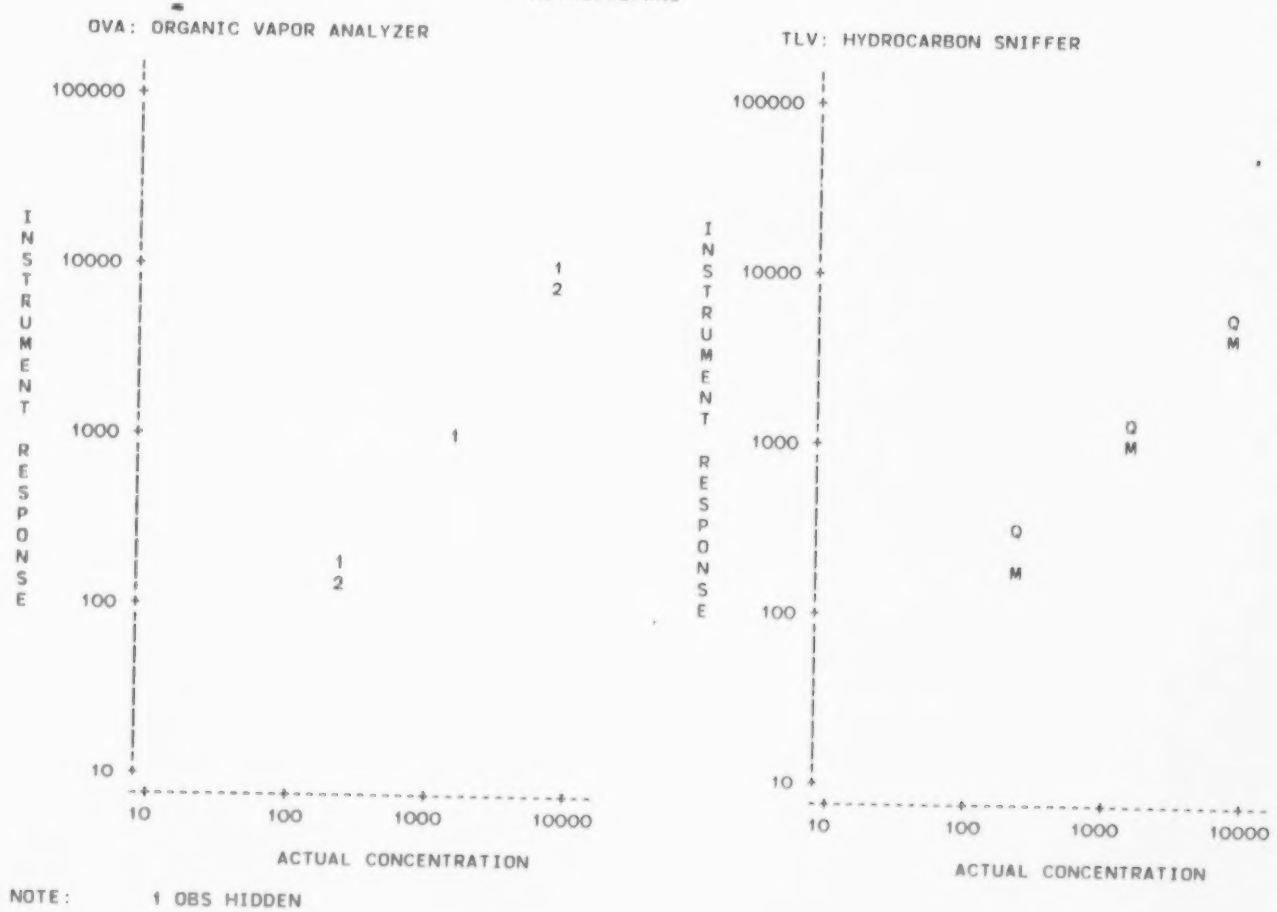
ESTIMATED AT 10,000 PPMV 1.77

95 % CONFIDENCE INTERVAL : (1.22, 2.57)

Figure 5-136

INSTRUMENT RESPONSE VS CONCENTRATION

NITROPROPANE



NOTE: 1 OBS HIDDEN

TABLE 5-137

RESPONSE FACTOR SUMMARY

NONANE-N

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	54	56	55	2.71	0.27	4	2.44	0.22	2	2.98	0.04	2						
500	485	490	488	4.04	0.21	4	3.83	0.88	2	4.25	0.94	2						
2500	2465	2465	2465	0.87	0.03	2	0.90		1	0.84		1						
4000	3933	3956	3944	2.44	0.03	4	2.41	0.44	2	2.47	0.37	2						
			OVERALL MEANS	2.75	0.01	14	2.61	0.44	7	2.89	0.50	7						

ESTIMATED AT 10,000 PPMV 1.62

95 % CONFIDENCE INTERVAL : (0.93, 2.81)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7O	SE	N
50	54	56	55	1.37	0.16	4	1.53	0.33	2	1.21	0.33	2						
500	485	490	488	3.52	0.20	4	3.72	1.19	2	3.31	1.28	2						
2500	2465	2465	2465	12.10	1.77	2	13.87		1	10.34		1						
4000	3933	3956	3944	3.22	0.42	4	3.64	1.12	2	2.80	0.79	2						
			OVERALL MEANS	4.05	0.03	14	4.52	1.65	7	3.57	1.22	7						

ESTIMATED AT 10,000 PPMV 5.54

95 % CONFIDENCE INTERVAL : (2.82, 10.89)

Figure 5-137

INSTRUMENT RESPONSE VS CONCENTRATION

NONANE-N

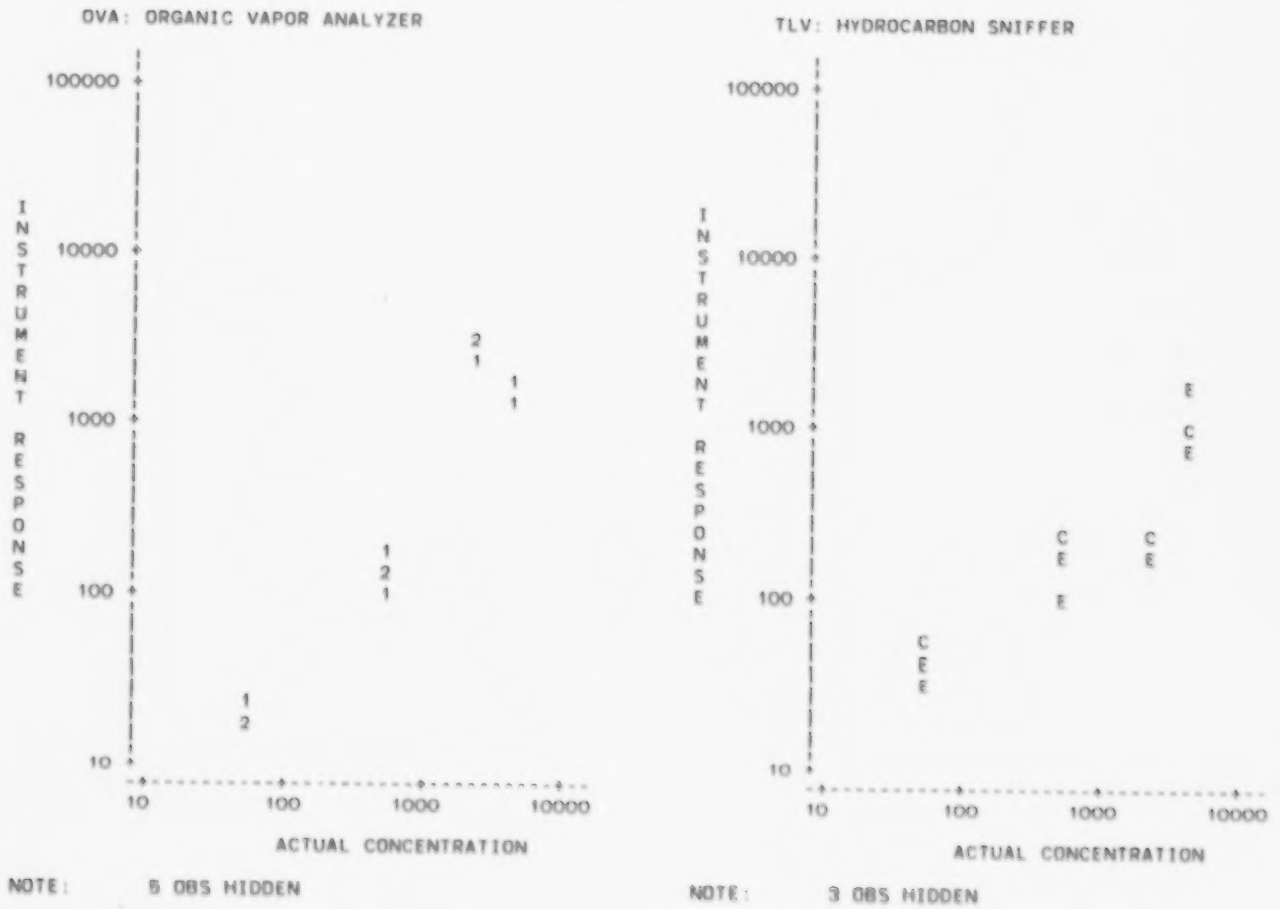


TABLE 5-138

RESPONSE FACTOR SUMMARY

OCTANE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	1080 SE	1080 N	2254	2254 SE	2254 N	2159	2159 SE	2159 N	1813	1813 SE	1813 N
200	223	223	223	2.27	0.23	2	2.04		1	2.50		1						
1500	1417	1417	1417	1.59	0.11	2	1.48		1	1.71		1						
6650	6508	6508	6508	1.12	0.02	2	1.10		1	1.15		1						
		OVERALL MEANS		1.66	0.02	6	1.84	0.27	3	1.79	0.39	3						

ESTIMATED AT 10,000 PPMV 1.04

95 % CONFIDENCE INTERVAL : (0.88, 1.22)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	7E SE	7E N	7C	7C SE	7C N	7M	7M SE	7M N	7Q	7Q SE	7Q N
200	223	223	223	1.99	0.07	2	1.92		1	2.06		1						
1500	1417	1417	1417	1.89	0.12	2	2.01		1	1.77		1						
6650	6508	6508	6508	2.15	0.17	2	2.32		1	1.97		1						
		OVERALL MEANS		2.01	0.01	6	2.08	0.12	3	1.94	0.09	3						

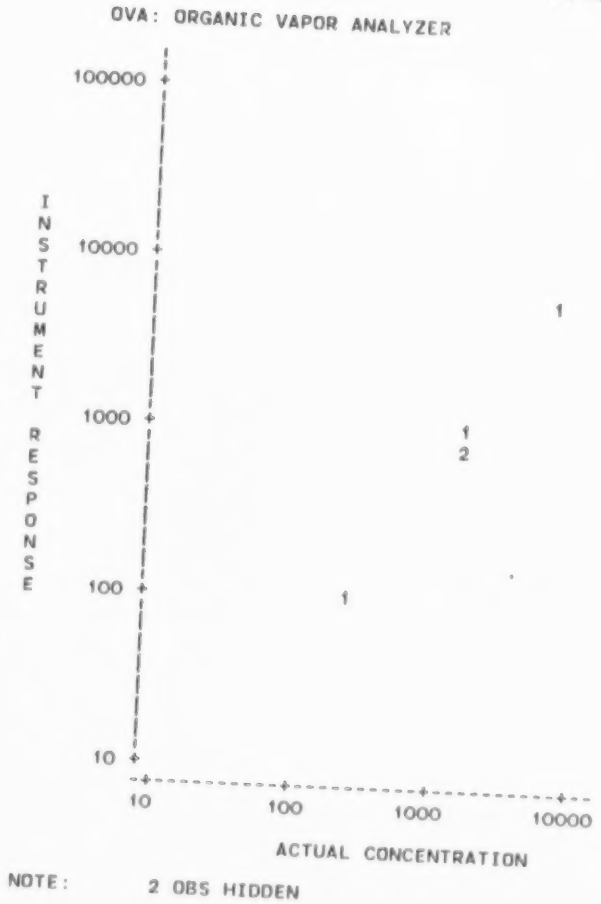
ESTIMATED AT 10,000 PPMV 2.08

95 % CONFIDENCE INTERVAL : (1.76, 2.46)

Figure 5-138

INSTRUMENT RESPONSE VS CONCENTRATION

OCTANE



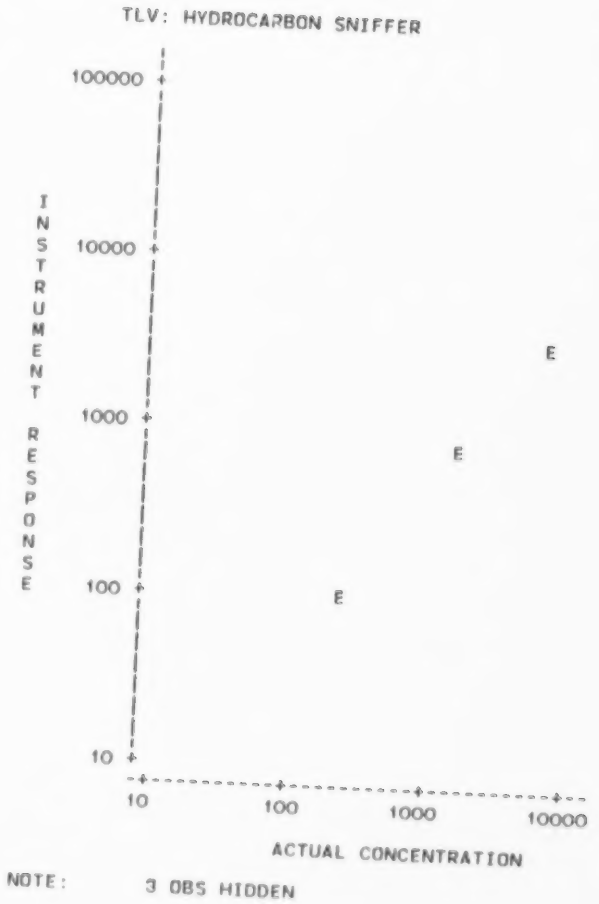


TABLE 5-139

RESPONSE FACTOR SUMMARY

PENTANE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	220	220	220	1.33	0.08	2	1.41		1	1.26		1						
1500	1454	1454	1454	0.94	0.03	2	0.97		1	0.91		1						
5000	4810	4810	4810	0.48	0.00	2	0.48		1	0.48		1						
8000	7839	7839	7839															
OVERALL MEANS				0.92	0.01	6	0.95	0.27	3	0.88	0.22	3						

ESTIMATED AT 10,000 PPMV 0.42

95 % CONFIDENCE INTERVAL : (0.30, 0.58)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	220	220	220	0.78	0.05	2	0.82		1	0.73		1						
1500	1454	1454	1454	0.60	0.01	2	0.61		1	0.59		1						
5000	4810	4810	4810	0.64	0.00	2	0.64		1	0.64		1						
8000	7839	7839	7839	0.66	0.01	2	0.65		1	0.68		1						
OVERALL MEANS				0.67	0.00	8	0.68	0.05	4	0.66	0.03	4						

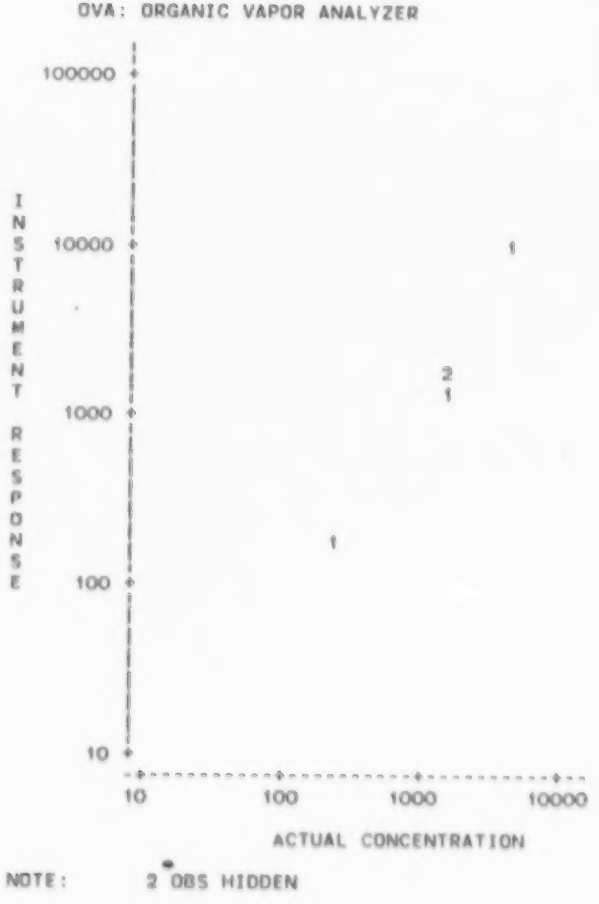
ESTIMATED AT 10,000 PPMV 0.62

95 % CONFIDENCE INTERVAL : (0.55, 0.69)

Figure 5-139

INSTRUMENT RESPONSE VS CONCENTRATION

PENTANE



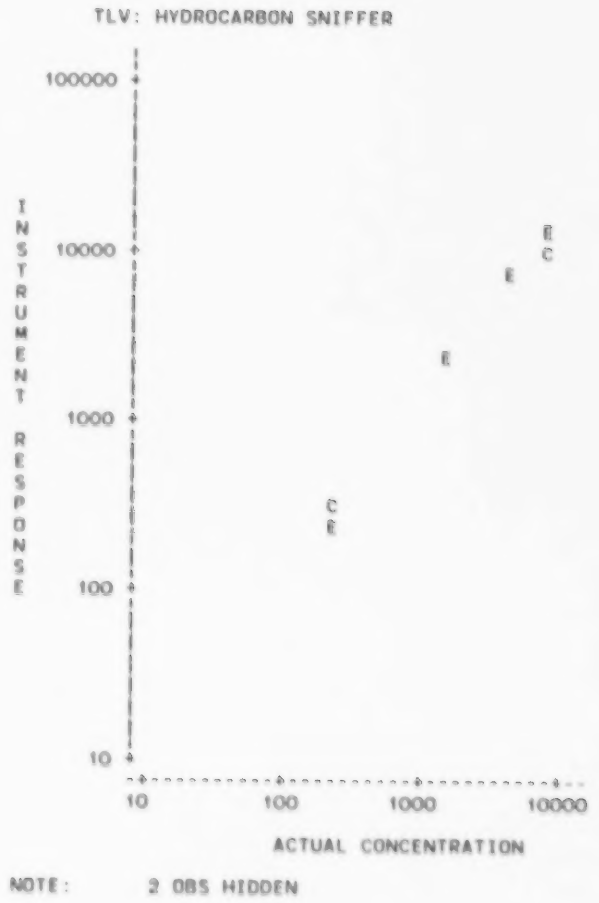


TABLE 5-140

RESPONSE FACTOR SUMMARY

PHENOL

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
100	72	72	72	2.08	0.29	2							1.79		1	2.38		1
200	223	223	223	3.63	0.09	2							3.72		1	3.54		1
300	278	278	278	3.45	0.46	2							2.99		1	3.92		1
600	657	657	657	3.97	0.32	2							3.65		1	4.29		1
1000	913	913	913	5.65	0.05	2							5.70		1	5.60		1
	OVERALL MEANS			3.76	0.02	10							3.57	0.64	5	3.95	0.52	5

ESTIMATED AT 10,000 PPMV 11.75

95 % CONFIDENCE INTERVAL : (7.55,18.29)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
100	72	72	72	0.57		1				0.57		1						
200	223	223	223	1.86		1				1.86		1						
300	278	278	278	1.79		1				1.79		1						
600	657	657	657	2.12		1				2.12		1						
1000	913	913	913	2.92		1				2.92		1						
	OVERALL MEANS			1.85		5				1.85	0.38	5						

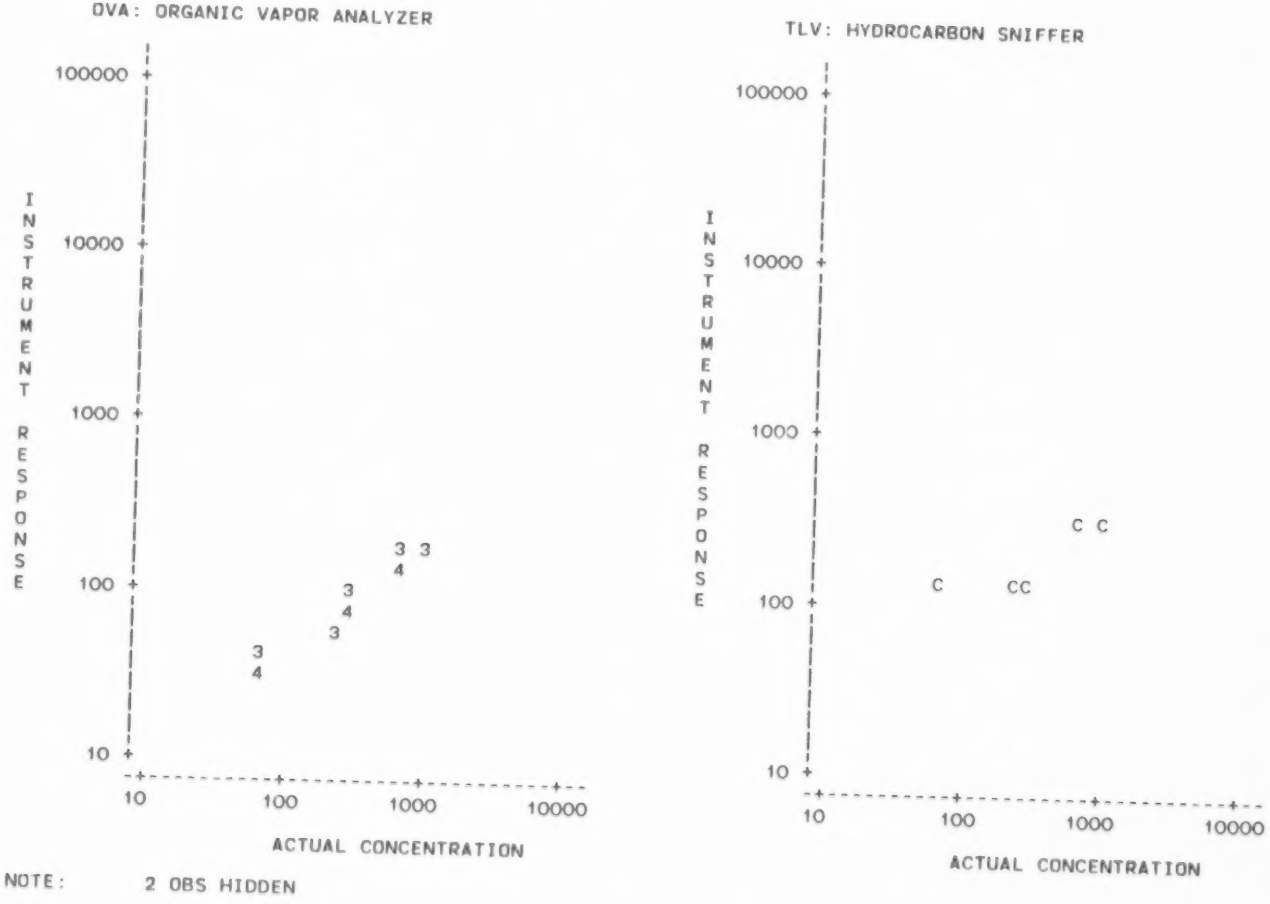
ESTIMATED AT 10,000 PPMV 12.01

95 % CONFIDENCE INTERVAL : (3.57,40.43)

Figure 5-140

INSTRUMENT RESPONSE VS CONCENTRATION

PHENOL



NOTE: 2 OBS HIDDEN

TABLE 5-141

RESPONSE FACTOR SUMMARY

PHENYL-2-PROPANOL,2-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	223	223	223	9.57	1.60	2	7.98		1	11.17		1						
1500	1668	1668	1668	30.48	3.57	2	26.91		1	34.05		1						
8000	8383	8383	8383	82.84	4.49	2	78.35		1	87.32		1						
			OVERALL MEANS	40.96	0.54	6	37.74	21	3	44.18	22.6	3						

ESTIMATED AT 10,000 PPMV 89.56 95 % CONFIDENCE INTERVAL : (69.84,114.8)

TLV INSTRUMENTS

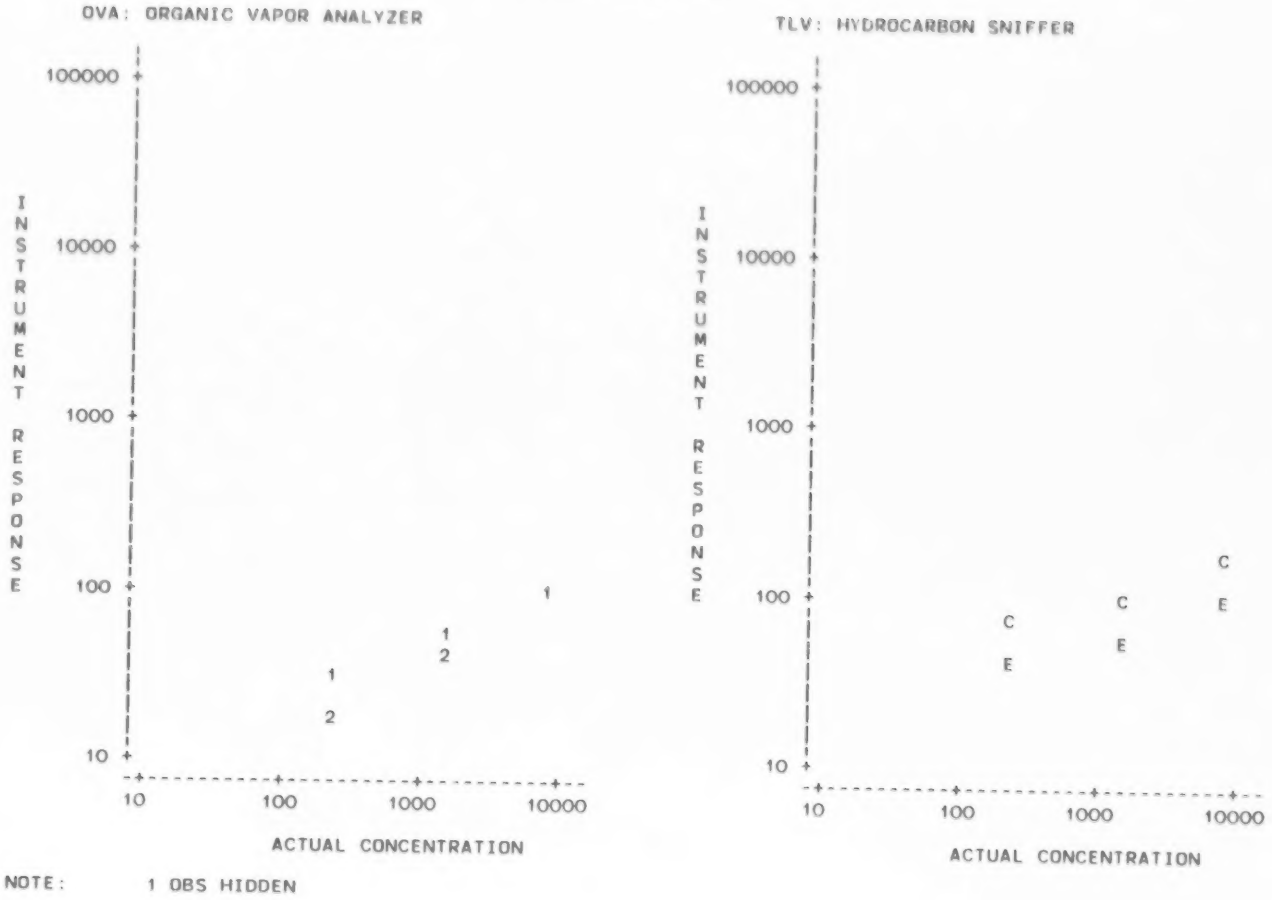
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	223	223	223	4.03	0.78	2	4.81		1	3.25		1						
1500	1668	1668	1668	22.61	5.13	2	27.74		1	17.49		1						
8000	8383	8383	8383	68.70	18.9	2	87.61		1	49.79		1						
			OVERALL MEANS	31.78	1.38	6	40.05	24.7	3	23.51	13.8	3						

ESTIMATED AT 10,000 PPMV 76.57 95 % CONFIDENCE INTERVAL : (46.38,126.4)

Figure 5-141

INSTRUMENT RESPONSE VS CONCENTRATION

PHENYL-2-PROPANOL,2-



NOTE: 1 OBS HIDDEN

TABLE 5-142

RESPONSE FACTOR SUMMARY

PICOLINE,2-

OVA INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL	ACTUAL PPMV			OVERALL			OVA METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	217	217	217	1.07	0.05	2	1.01		1	1.12		1						
1500	1609	1609	1609	0.63	0.06	2	0.58		1	0.69		1						
4000	4019	4019	4019	0.43	0.02	2	0.40		1	0.45		1						
5000	5536	5536	5536															
8000	8039	8039	8039															
		OVERALL MEANS		0.71	0.01	6	0.66	0.18	3	0.75	0.20	3						

ESTIMATED AT 10,000 PPMV 0.34 95 % CONFIDENCE INTERVAL : (0.27, 0.41)

TLV INSTRUMENTS

R E S P O N S E F A C T O R S

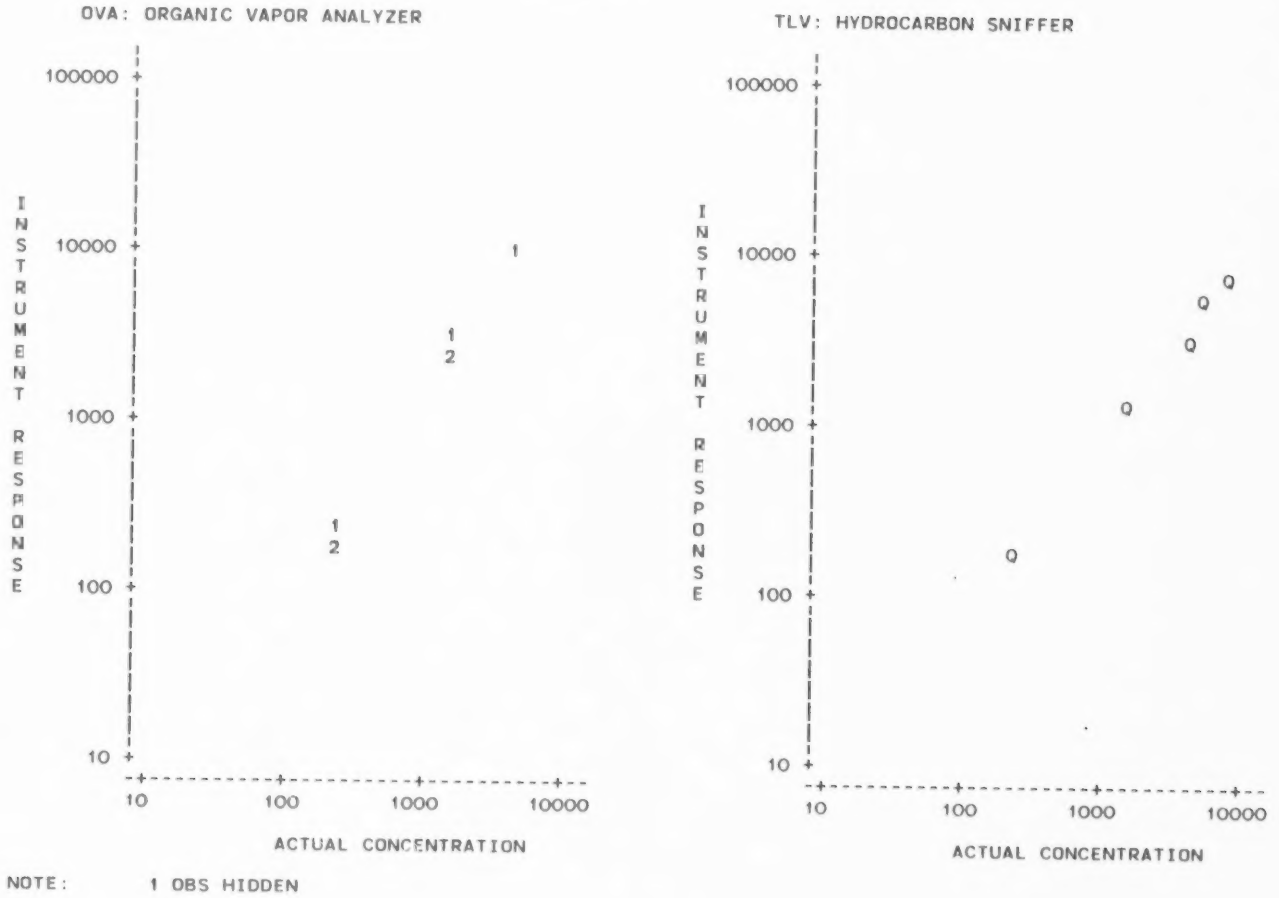
NOMINAL	ACTUAL PPMV			OVERALL			TLV METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	217	217	217	1.05		1										1.05		1
1500	1609	1609	1609	1.19		1										1.19		1
4000	4019	4019	4019	1.16		1										1.16		1
5000	5536	5536	5536	1.12		1										1.12		1
8000	8039	8039	8039	1.16		1										1.16		1
		OVERALL MEANS		1.14		5										1.14	0.02	5

ESTIMATED AT 10,000 PPMV 1.17 95 % CONFIDENCE INTERVAL : (1.10, 1.25)

Figure 5-142

INSTRUMENT RESPONSE VS CONCENTRATION

PICOLINE,2-



NOTE: 1 OBS HIDDEN

TABLE 5-143

RESPONSE FACTOR SUMMARY

PROPANE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1000	896	1039	967	0.84	0.01	4	0.83	0.38	2	0.85	0.40	2						
2000	2029	2150	2089	3.12	0.04	4	3.16	2.08	2	3.09	2.04	2						
4000	4323	4323	4323	0.59	0.05	2	0.53		1	0.64		1						
6000	6450	6450	6450															
14E3	14E3	14E3	14E3															
OVERALL MEANS				1.70	0.00	10	1.70	0.90	5	1.70	0.87	5						

ESTIMATED AT 10,000 PPMV 0.88

95 % CONFIDENCE INTERVAL : (0.10, 7.54)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
1000	896	1039	967	0.41		2										0.41	0.13	2
2000	2029	2150	2089	1.37		2										1.37	0.74	2
4000	4323	4323	4323	0.63		1										0.63		1
6000	6450	6450	6450	0.63		1										0.63		1
14E3	14E3	14E3	14E3	0.66		1										0.66		1
OVERALL MEANS				0.78		7										0.78	0.22	7

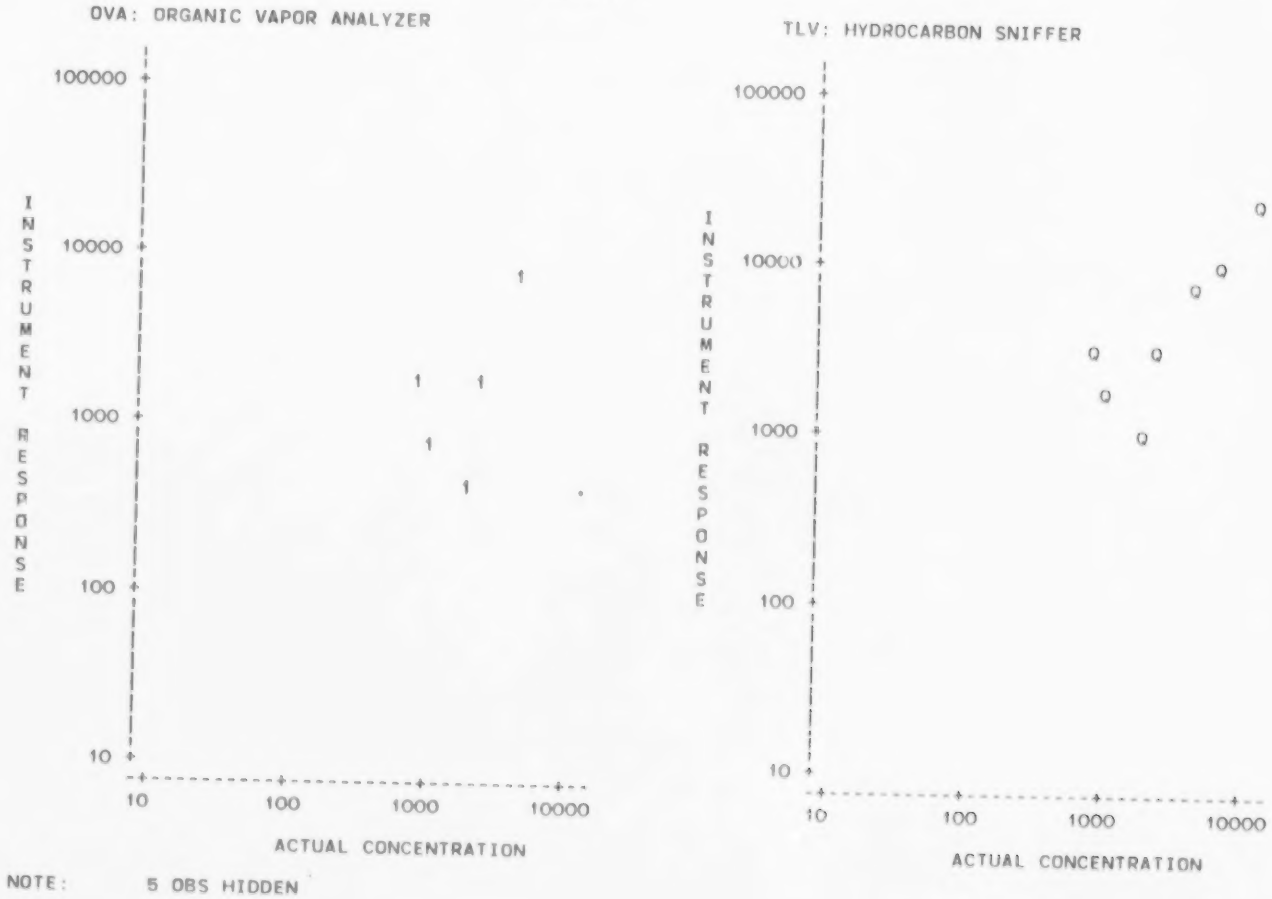
ESTIMATED AT 10,000 PPMV 0.63

95 % CONFIDENCE INTERVAL : (0.24, 1.64)

Figure 5-143

INSTRUMENT RESPONSE VS CONCENTRATION

PROPANE



NOTE: 5 OBS HIDDEN

TABLE 5-144

RESPONSE FACTOR SUMMARY

PROPIONALDEHYDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	223	223	223	3.48	0.00	2	3.48		1	3.48		1						
1500	1505	1505	1505	2.30	0.03	2	2.33		1	2.27		1						
8000	7868	8101	7984	1.20	0.05	2	1.26		1	1.15		1						
OVERALL MEANS				2.33	0.00	6	2.36	0.64	3	2.30	0.67	3						

ESTIMATED AT 10.000 PPMV 1.19

95 % CONFIDENCE INTERVAL : (1.02, 1.39)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS: TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	223	223	223	1.24	0.24	2	1.48		1	0.99		1						
1500	1505	1505	1505	1.95	0.37	2	2.32		1	1.58		1						
8000	7868	8101	7984	1.56	0.03	3	1.60		1	1.54	0.21	2						
OVERALL MEANS				1.58	0.03	7	1.80	0.26	3	1.41	0.16	4						

ESTIMATED AT 10.000 PPMV 1.65

95 % CONFIDENCE INTERVAL : (1.16, 2.36)

Figure 5-144

INSTRUMENT RESPONSE VS CONCENTRATION

PROPIONALDEHYDE

NOTE: 1 OBS HIDDEN

NOTE: 1 OBS HIDDEN

TABLE 5-145

RESPONSE FACTOR SUMMARY

PROPIONIC ACID

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2459	SE	N	1813	SE	N
200	213	213	213	2.25	0.23	2	2.01		1	2.48		1						
1500	1552	1552	1552	1.66	0.11	2	1.56		1	1.77		1						
2700	2903	2903	2903	1.62	0.09	2	1.53		1	1.71		1						
		OVERALL MEANS		1.84	0.02	6	1.70	0.16	3	1.99	0.25	3						

ESTIMATED AT 10,000 PPMV 1.34 95 % CONFIDENCE INTERVAL : (1.06, 1.69)

TLV INSTRUMENTS

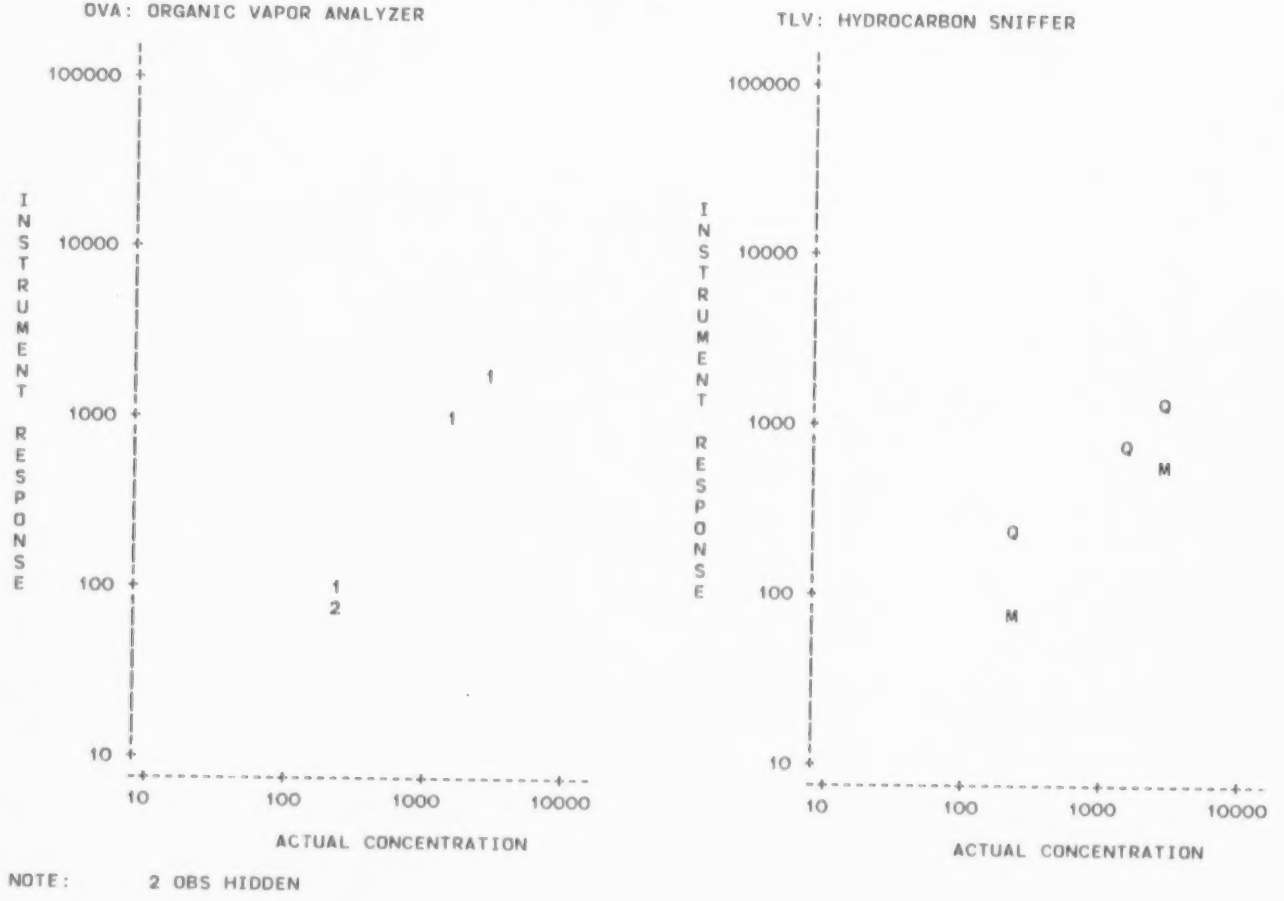
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	213	213	213	1.97	0.94	2							2.91		1	1.03		1
1500	1552	1552	1552	2.05		1										2.05		1
2700	2903	2903	2903	3.52	1.09	2							4.61		1	2.43		1
		OVERALL MEANS		2.60	0.19	5							3.76	0.85	2	1.83	0.42	3

ESTIMATED AT 10,000 PPMV 3.51 95 % CONFIDENCE INTERVAL : (0.90,13.62)

Figure 5-145

INSTRUMENT RESPONSE VS CONCENTRATION

PROPIONIC ACID



NOTE: 2 OBS HIDDEN

TABLE 5-146

RESPONSE FACTOR SUMMARY

PROPYL ALCOHOL

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	201	201	201	2.48	0.12	2	2.36		1	2.60		1						
1500	1536	1536	1536	1.79	0.06	2	1.73		1	1.85		1						
8000	8467	8467	8467	0.89	0.03	2	0.86		1	0.92		1						
		OVERALL MEANS		1.72	0.01	6	1.65	0.44	3	1.79	0.49	3						

ESTIMATED AT 10,000 PPMV 0.91 95 % CONFIDENCE INTERVAL : (0.72, 1.15)

TLV INSTRUMENTS

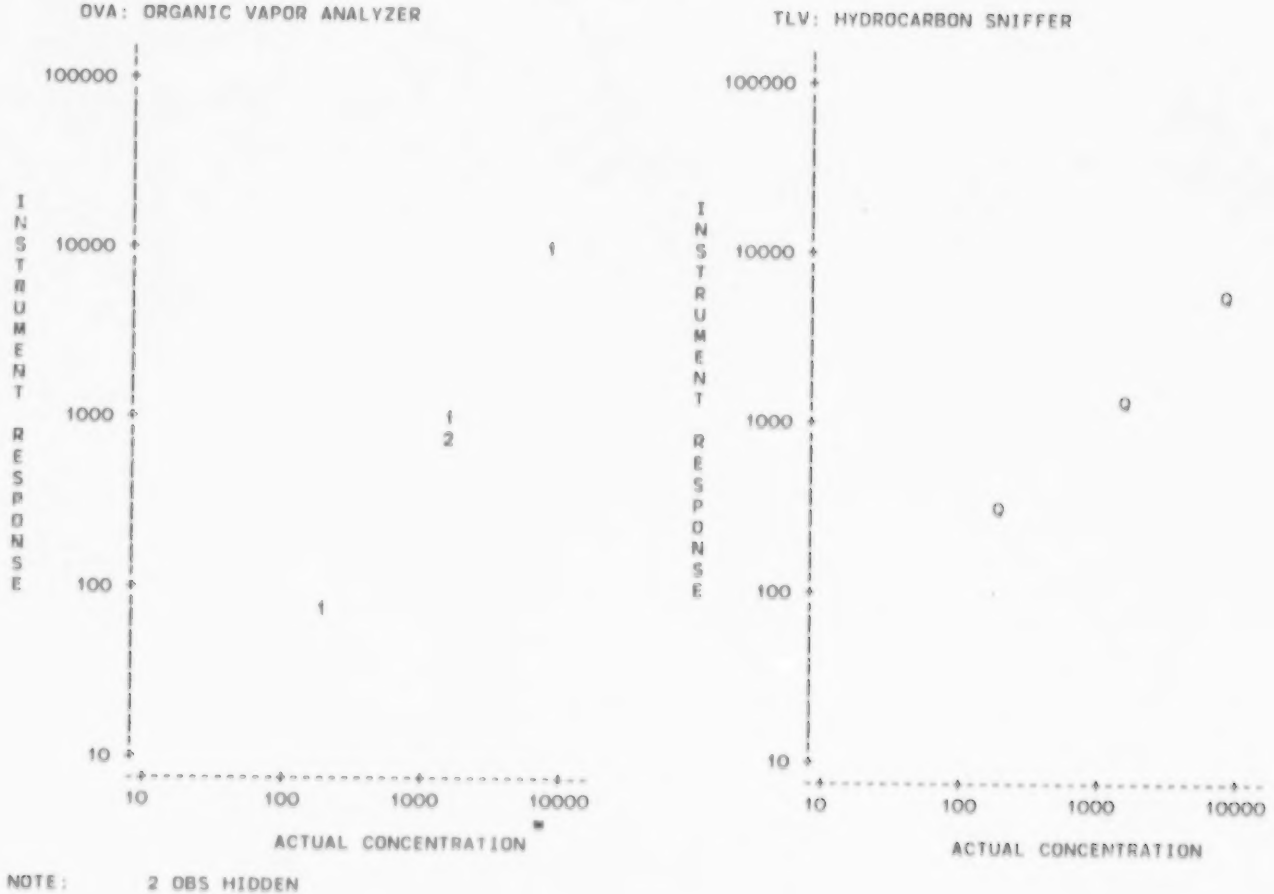
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	201	201	201	0.69		1										0.69		1
1500	1536	1536	1536	1.02		1										1.02		1
8000	8467	8467	8467	1.52		1										1.52		1
		OVERALL MEANS		1.08		3										1.08	0.24	3

ESTIMATED AT 10,000 PPMV 1.55 95 % CONFIDENCE INTERVAL : (1.41, 1.71)

Figure 5-146

INSTRUMENT RESPONSE VS CONCENTRATION

PROPYL ALCOHOL



NOTE: 2 OBS HIDDEN

TABLE 5-147

RESPONSE FACTOR SUMMARY

PROPYLBENZENE,N-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	217	217	217	1.03	0.08	2	0.96		1	1.11		1						
1500	1537	1537	1537	0.72	0.02	2	0.70		1	0.73		1						
8000	3243	3243	3243	0.55	0.01	2	0.53		1	0.56		1						
		OVERALL MEANS		0.77	0.01	6	0.73	0.12	3	0.80	0.16	3						

ESTIMATED AT 10,000 PPMV 0.44

95 % CONFIDENCE INTERVAL : (0.37, 0.53)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	217	217	217	1.97	0.68	2	2.65		1	1.29		1						
1500	1537	1537	1537	9.06	7.00	2	16.06		1	2.07		1						
8000	3243	3243	3243	16.64	15	2	31.63		1	1.65		1						
		OVERALL MEANS		9.22	1.26	6	16.78	8.37	3	1.67	0.22	3						

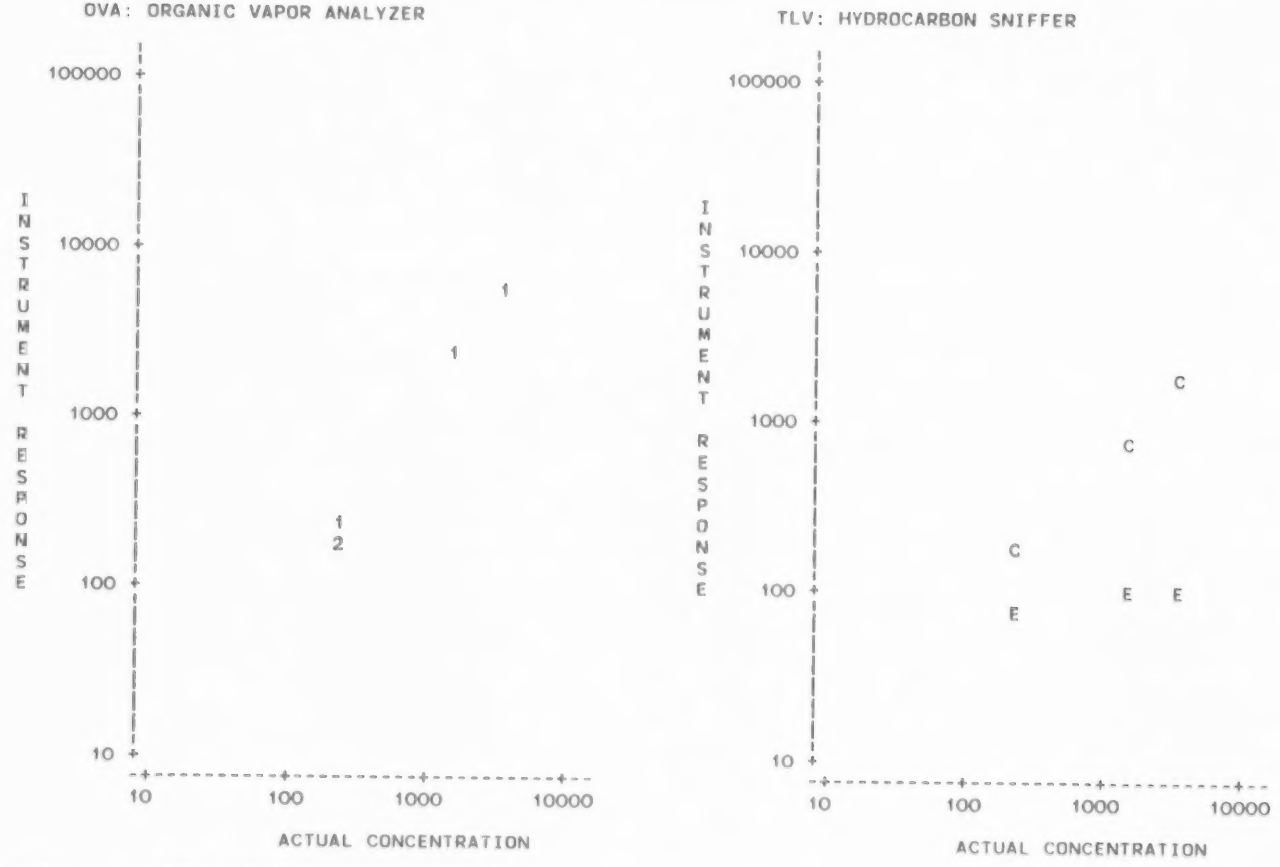
ESTIMATED AT 10,000 PPMV 5.97

95 % CONFIDENCE INTERVAL : (0.33, 108.7)

Figure 5-147

INSTRUMENT RESPONSE VS CONCENTRATION

PROPYLBENZENE,N-



NOTE: 2 OBS HIDDEN

TABLE 5-148

RESPONSE FACTOR SUMMARY

PROPYLENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
500	537	537	537	0.58	0.02	2	0.60		1	0.57		1						
2000	2119	2119	2119	1.06	0.05	2	1.01		1	1.12		1						
5000	4848	4848	4848	0.63	0.02	2	0.61		1	0.65		1						
8000	8882	8882	8882															
		OVERALL MEANS		0.76	0.00	6	0.74	0.14	3	0.78	0.17	3						

ESTIMATED AT 10,000 PPMV 0.79 95 % CONFIDENCE INTERVAL : (0.39, 1.57)

TLV INSTRUMENTS

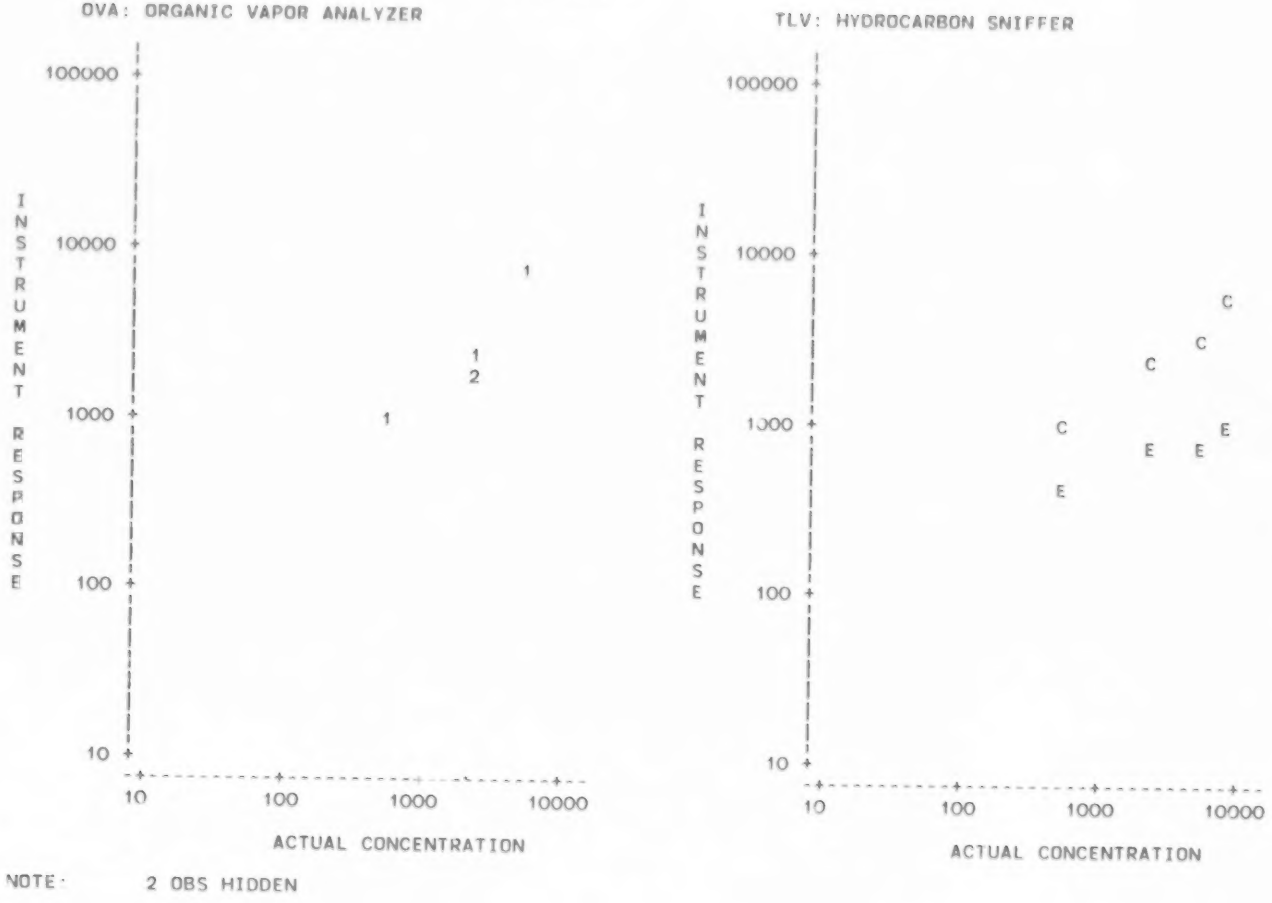
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
500	537	537	537	0.90	0.41	2	1.31		1	0.50		1						
2000	2119	2119	2119	2.07	1.16	2	3.23		1	0.92		1						
5000	4848	4848	4848	3.72	2.39	2	6.11		1	1.33		1						
8000	8882	8882	8882	4.88	3.45	2	8.33		1	1.44		1						
		OVERALL MEANS		2.90	0.23	8	4.75	1.50	4	1.05	0.21	4						

ESTIMATED AT 10,000 PPMV 2.80 95 % CONFIDENCE INTERVAL : (0.96, 8.20)

Figure 5-148

INSTRUMENT RESPONSE VS CONCENTRATION

PROPYLENE



NOTE: 2 OBS HIDDEN

TABLE 5-149

RESPONSE FACTOR SUMMARY

PROPYLENE OXIDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N
200	237	237	237	1.59	0.15	2
1500	1467	1467	1467	1.25	0.03	2
7000	6558	6558	6558	0.89	0.06	2
8000	7633	7633	7633	0.76		1
			OVERALL MEANS	1.17	0.01	7
			ESTIMATED AT 10,000 PPMV	0.80		

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1.73		1	1.44		1						
1.23		1	1.28		1						
0.83		1	0.95		1						
			0.76		1						
1.26	0.26	3	1.11	0.15	4						

95 % CONFIDENCE INTERVAL : (0.69, 0.93)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N
200	237	237	237	1.40	0.65	2
1500	1467	1467	1467	1.09	0.25	2
7000	6558	6558	6558	1.26		1
8000	7633	7633	7633	1.29	0.13	2
			OVERALL MEANS	1.26	0.04	7
			ESTIMATED AT 10,000 PPMV	1.15		

RESPONSE FACTORS

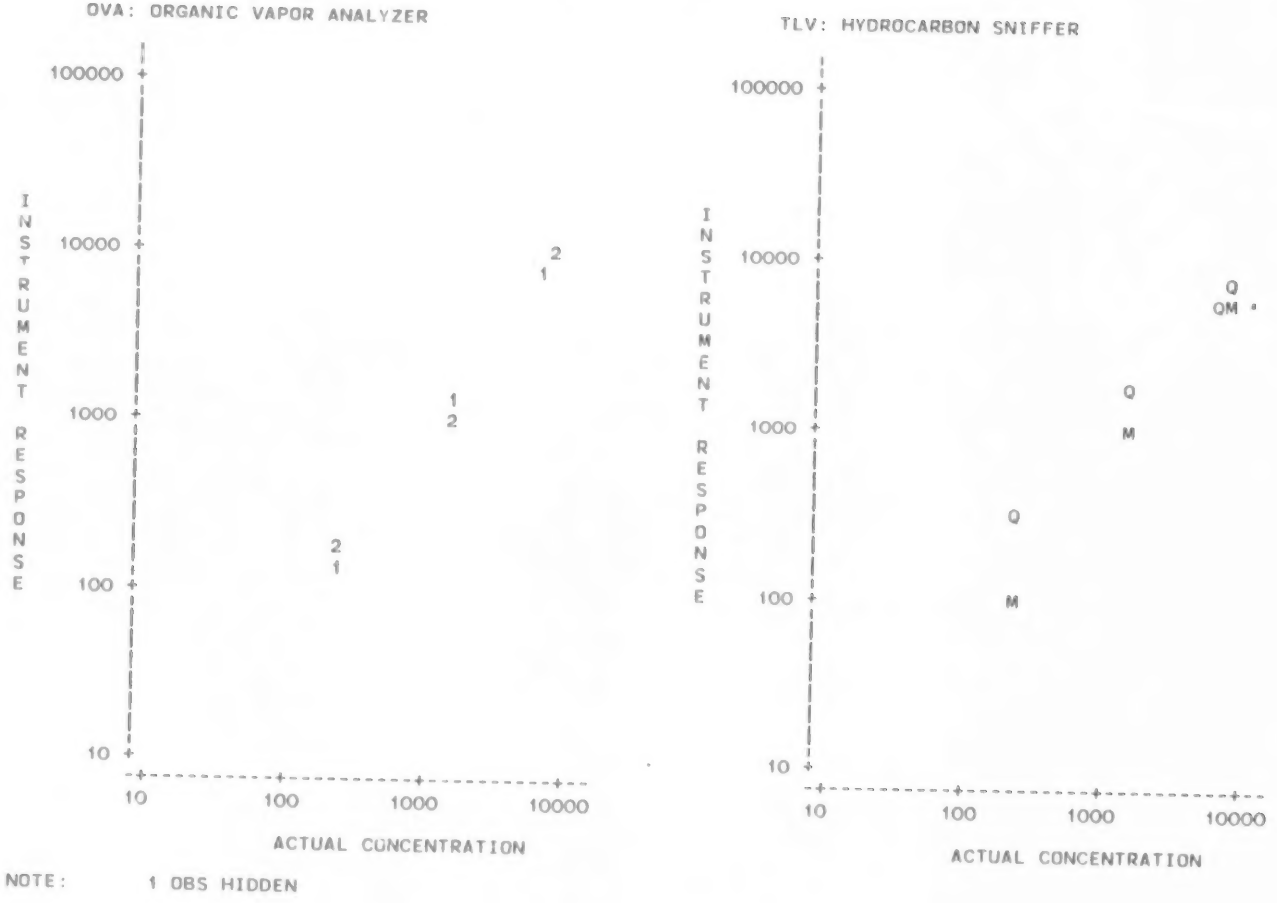
TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
						2.05		1	0.75		1
						1.35		1	0.84		1
									1.26		1
						1.42		1	1.15		1
						1.61	0.22	3	1.00	0.12	4

95 % CONFIDENCE INTERVAL : (0.68, 1.93)

Figure 5-149

INSTRUMENT RESPONSE VS CONCENTRATION

PROPYLENE OXIDE



NOTE: 1 OBS HIDDEN

TABLE 5-150

RESPONSE FACTOR SUMMARY

PYRIDINE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	226	226	226	0.73	0.04	2	0.70		1	0.77		1						
1500	1308	1308	1308	0.64	0.00	2	0.64		1	0.64		1						
4000	4070	4070	4070	0.45	0.01	2	0.44		1	0.46		1						
5000	5068	5068	5068															
6000	5812	5812	5812															
8000	8075	8075	8075															
OVERALL MEANS				0.61	0.00	6	0.59	0.08	3	0.62	0.09	3						

ESTIMATED AT 10,000 PPMV 0.41 95 % CONFIDENCE INTERVAL : (0.33, 0.51)

TLV INSTRUMENTS

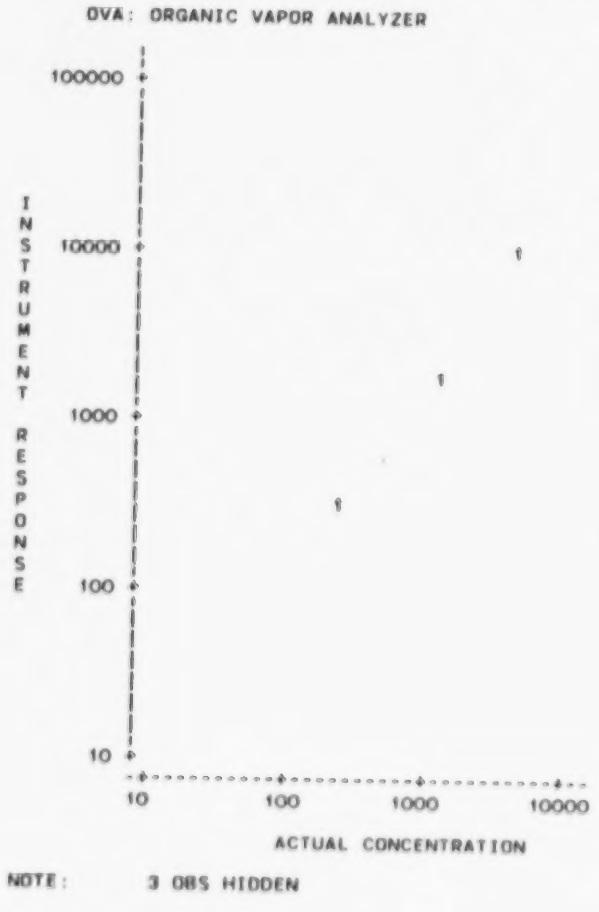
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	226	226	226	1.17	0.24	2												
1500	1308	1308	1308	1.24	0.18	2							1.41		1	0.94		1
4000	4070	4070	4070	1.20	0.06	2							1.52		1	1.16		1
5000	5068	5068	5068	1.17	0.07	2							1.27		1	1.14		1
6000	5812	5812	5812	1.18	0.03	2							1.25		1	1.10		1
8000	8075	8075	8075	1.12	0.02	2							1.21		1	1.15		1
													1.14		1	1.10		1
OVERALL MEANS				1.20	0.01	12							1.30	0.06	6	1.10	0.03	6

ESTIMATED AT 10,000 PPMV 1.17 95 % CONFIDENCE INTERVAL : (1.03, 1.32)

Figure 5-150

INSTRUMENT RESPONSE VS CONCENTRATION

PYRIDINE



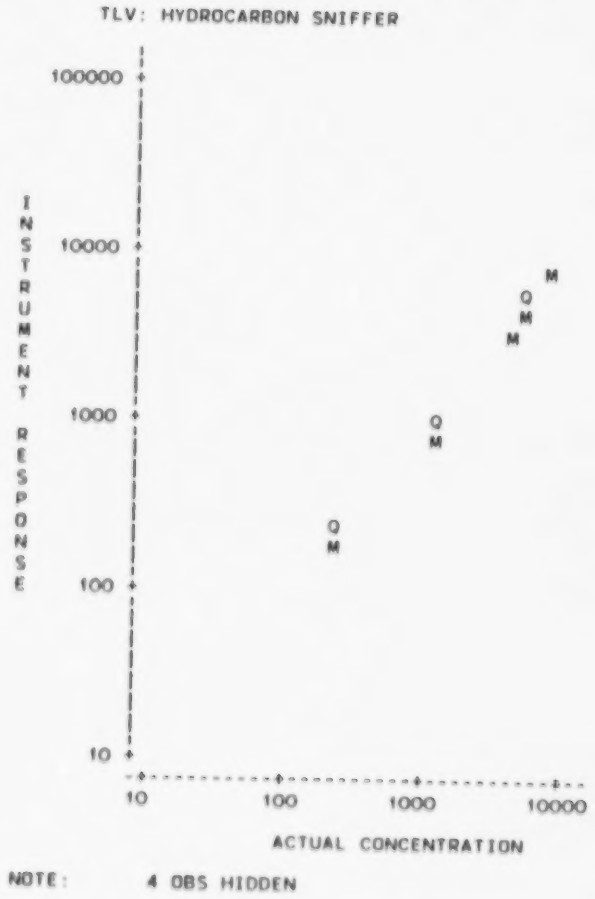


TABLE 5-151

RESPONSE FACTOR SUMMARY

STYRENE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	212	212	212	4.14	0.28	2	3.86		1	4.42		1						
1500	1471	1471	1471	3.87	0.16	2	3.71		1	4.03		1						
8000	8669	8669	8669	4.29	0.05	2	4.24		1	4.35		1						
		OVERALL MEANS		4.10	0.03	6	3.94	0.16	3	4.26	0.12	3						

ESTIMATED AT 10,000 PPMV 4.16 95 % CONFIDENCE INTERVAL : (3.68, 4.71)

TLV INSTRUMENTS

RESPONSE FACTORS

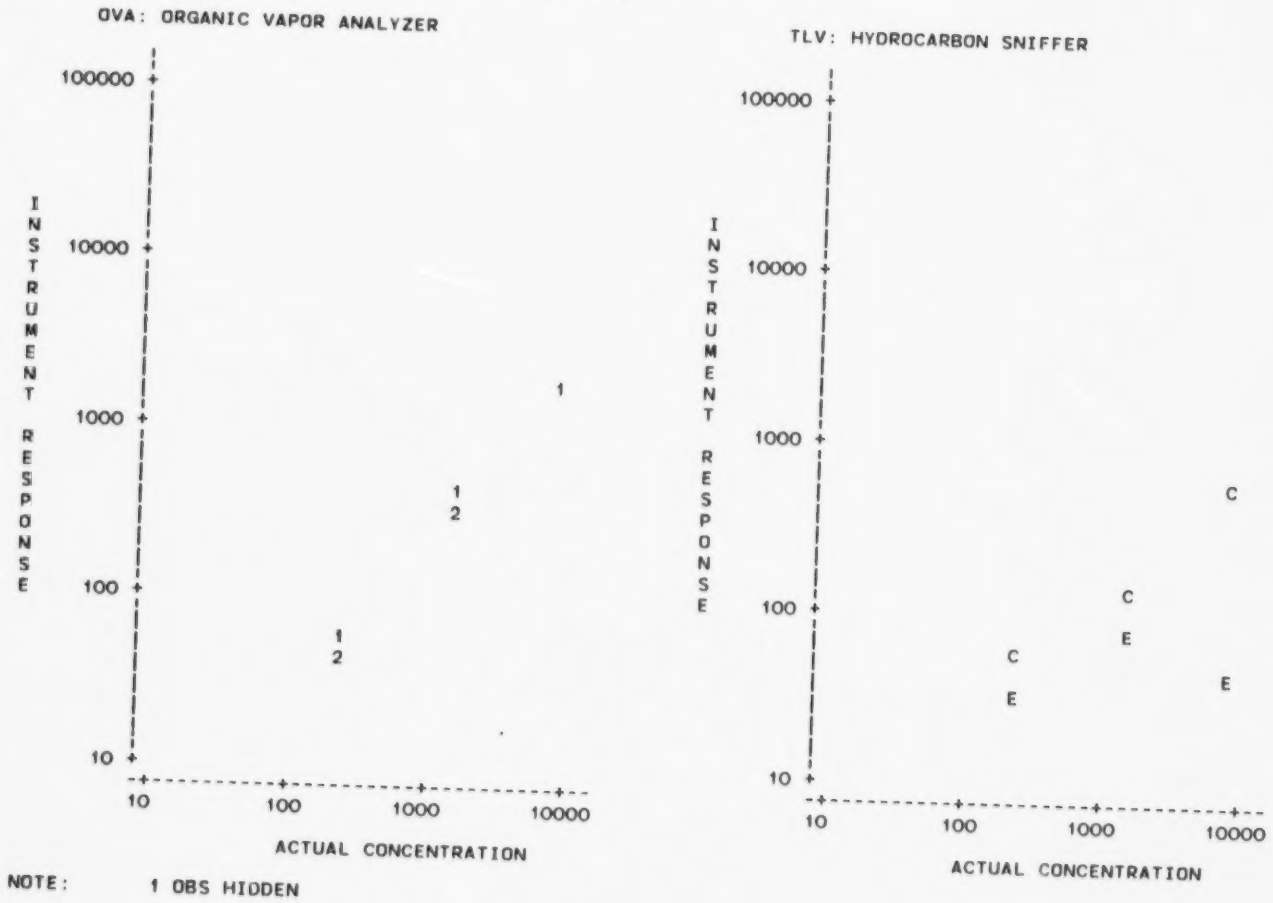
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	212	212	212	5.12	1.09	2	6.21		1	4.03		1						
1500	1471	1471	1471	16.32	3.98	2	20.30		1	12.33		1						
8000	8669	8669	8669	116.7	102	2	218.7		1	14.71		1						
		OVERALL MEANS		46.04	5.95	6	81.73	68.6	3	10.36	3.24	3						

ESTIMATED AT 10,000 PPMV 36.83 95 % CONFIDENCE INTERVAL : (7.32,185.3)

Figure 5-151

INSTRUMENT RESPONSE VS CONCENTRATION

STYRENE



NOTE: 1 OBS HIDDEN

TABLE 5-152

RESPONSE FACTOR SUMMARY

TETRACHLOROETHANE,1,1,1,2

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	226	228	227	1.32	0.01	4	1.31	0.86	2	1.32	0.85	2						
1000	1123	1123	1123	2.41	0.10	2	2.52		1	2.31		1						
1500	1467	1467	1467	2.48	0.02	2	2.46		1	2.51		1						
8000	7835	7835	7835	2.62	0.09	2	2.71		1	2.53		1						
			OVERALL MEANS	2.03	0.00	10	2.06	0.41	5	2.00	0.39	5						

ESTIMATED AT 10,000 PPMV 3.00 95 % CONFIDENCE INTERVAL : (1.27, 7.07)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	226	228	227	7.53	2.62	4	10.15	0.97	2	4.91	0.17	2						
1000	1123	1123	1123	5.71	0.86	2	6.57		1	4.85		1						
1500	1467	1467	1467	4.62	0.26	2	4.88		1	4.36		1						
8000	7835	7835	7835	8.91	0.09	2	8.82		1	9.01		1						
			OVERALL MEANS	6.86	0.13	10	8.11	1.09	5	5.61	0.86	5						

ESTIMATED AT 10,000 PPMV 6.52 95 % CONFIDENCE INTERVAL : (3.82,11.11)

Figure 5-152

INSTRUMENT RESPONSE VS CONCENTRATION

TETRACHLOROETHANE, 1, 1, 1, 2

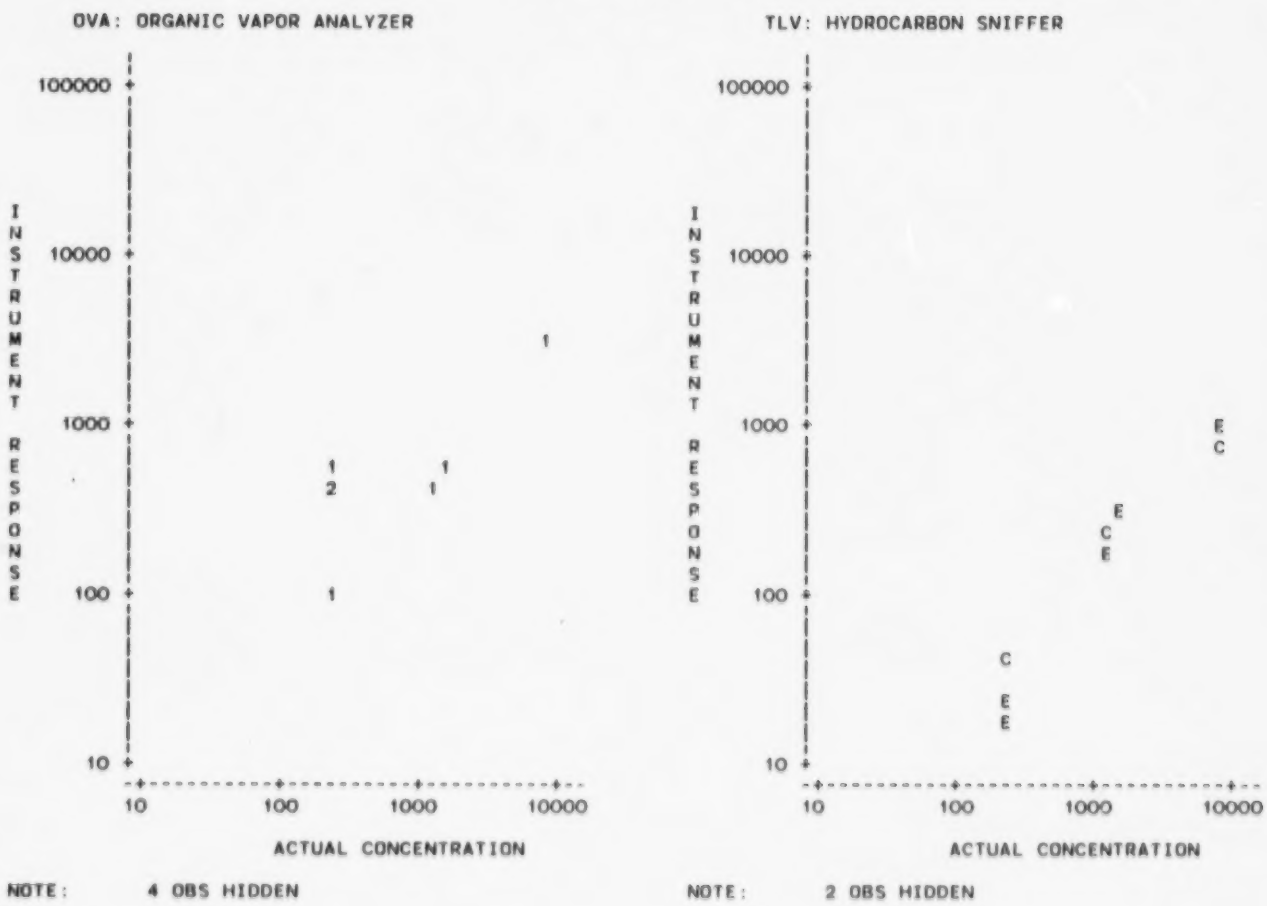


TABLE 5-153

RESPONSE FACTOR SUMMARY

TETRACHLOROETHANE, 1,1,2,2

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	210	210	210	3.33	0.05	2
500	572	572	572	4.58	0.05	2
1500	1453	1453	1453	5.50	0.40	2
6000	5896	5896	5896	5.16	0.23	2
			OVERALL MEANS	4.64	0.01	8

ESTIMATED AT 10,000 PPMV 6.06

RESPONSE FACTORS

OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
3.28		1	3.39		1						
4.63		1	4.54		1						
5.90		1	5.10		1						
4.93		1	5.38		1						
4.69	0.54	4	4.60	0.44	4						

95 % CONFIDENCE INTERVAL : (4.78, 7.68)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N
200	210	210	210	8.32	3.49	2
500	572	572	572	8.32	1.64	2
1500	1453	1453	1453	10.98	0.83	2
6000	5896	5896	5896	13.34	0.80	2
			OVERALL MEANS	10.24	0.21	8

ESTIMATED AT 10,000 PPMV 14.14

RESPONSE FACTORS

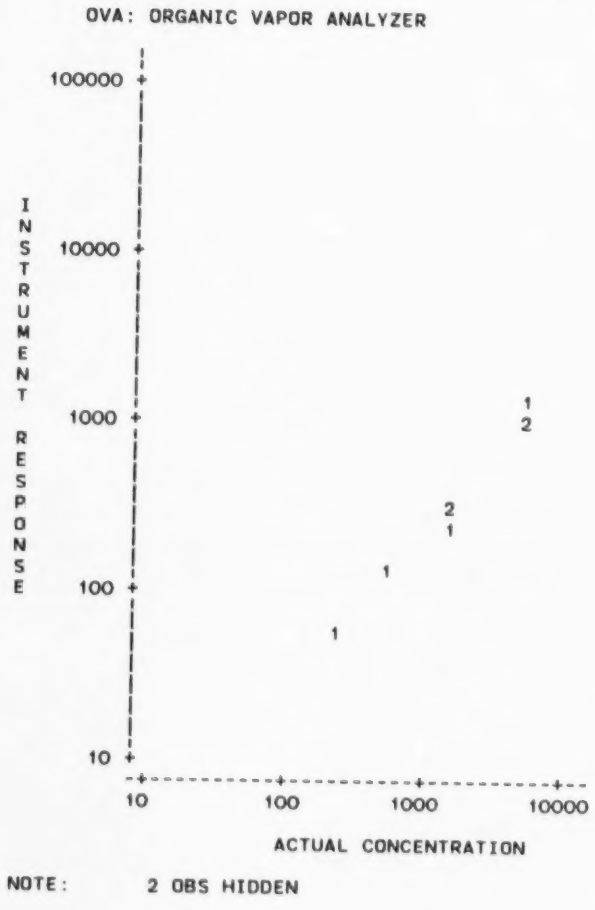
TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
11.81		1	4.83		1						
9.96		1	6.68		1						
11.81		1	10.15		1						
14.14		1	12.54		1						
11.93	0.86	4	8.55	1.73	4						

95 % CONFIDENCE INTERVAL : (8.51,23.51)

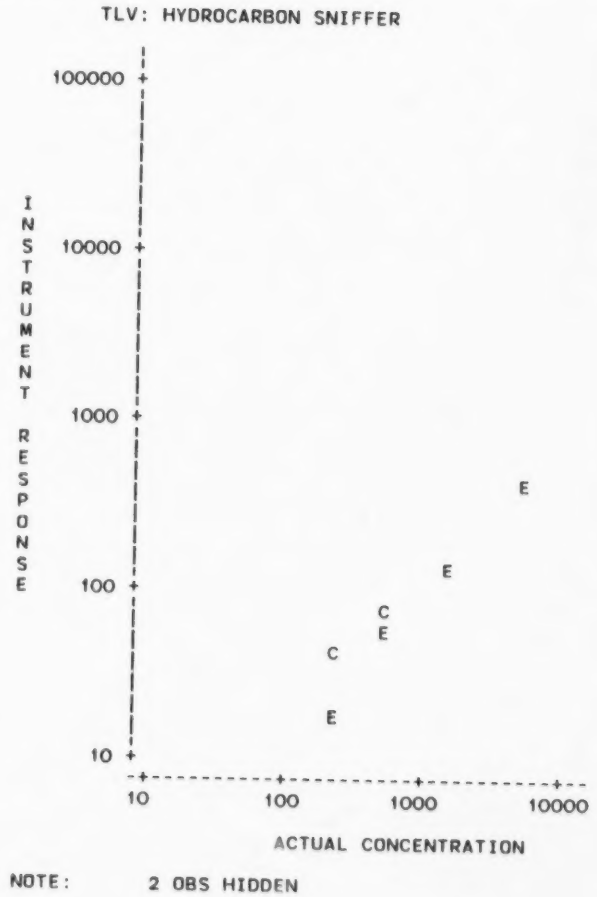
Figure 5-153

INSTRUMENT RESPONSE VS CONCENTRATION

TETRACHLOROETHANE, 1, 1, 2, 2



NOTE: 2 OBS HIDDEN



NOTE: 2 OBS HIDDEN

TABLE 5-154

RESPONSE FACTOR SUMMARY

TETRACHLOROETHYLENE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	23	62	48	6.30	0.43	7	6.79	0.46	3	5.93	1.70	4						
500	536	545	540	7.39	0.46	8	7.84	2.12	4	6.93	1.10	4						
5000	5371	5371	5371	1.33	0.00	2	1.33		1	1.34		1						
8000	8283	8658	8545	7.35	1.36	9	8.87	3.86	4	6.14	1.97	5						
		OVERALL MEANS		6.61	0.03	26	7.38	1.46	12	5.96	0.91	14						

ESTIMATED AT 10,000 PPMV 3.16 95 % CONFIDENCE INTERVAL : (1.92, 5.21)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
50	23	62	48	1.96	0.29	7	2.21	0.44	4	1.62	0.37	3						
500	536	545	540	8.87	0.50	8	9.37	1.40	4	8.37	1.56	4						
5000	5371	5371	5371	8.17	0.02	2	8.19		1	8.15		1						
8000	8283	8658	8545	10.85	0.51	9	11.31	1.39	5	10.27	1.66	4						
		OVERALL MEANS		7.64	0.01	26	7.93	1.20	14	7.30	1.23	12						

ESTIMATED AT 10,000 PPMV 11.46 95 % CONFIDENCE INTERVAL : (8.64,15.20)

Figure 5-154

INSTRUMENT RESPONSE VS CONCENTRATION

TETRACHLOROETHYLENE

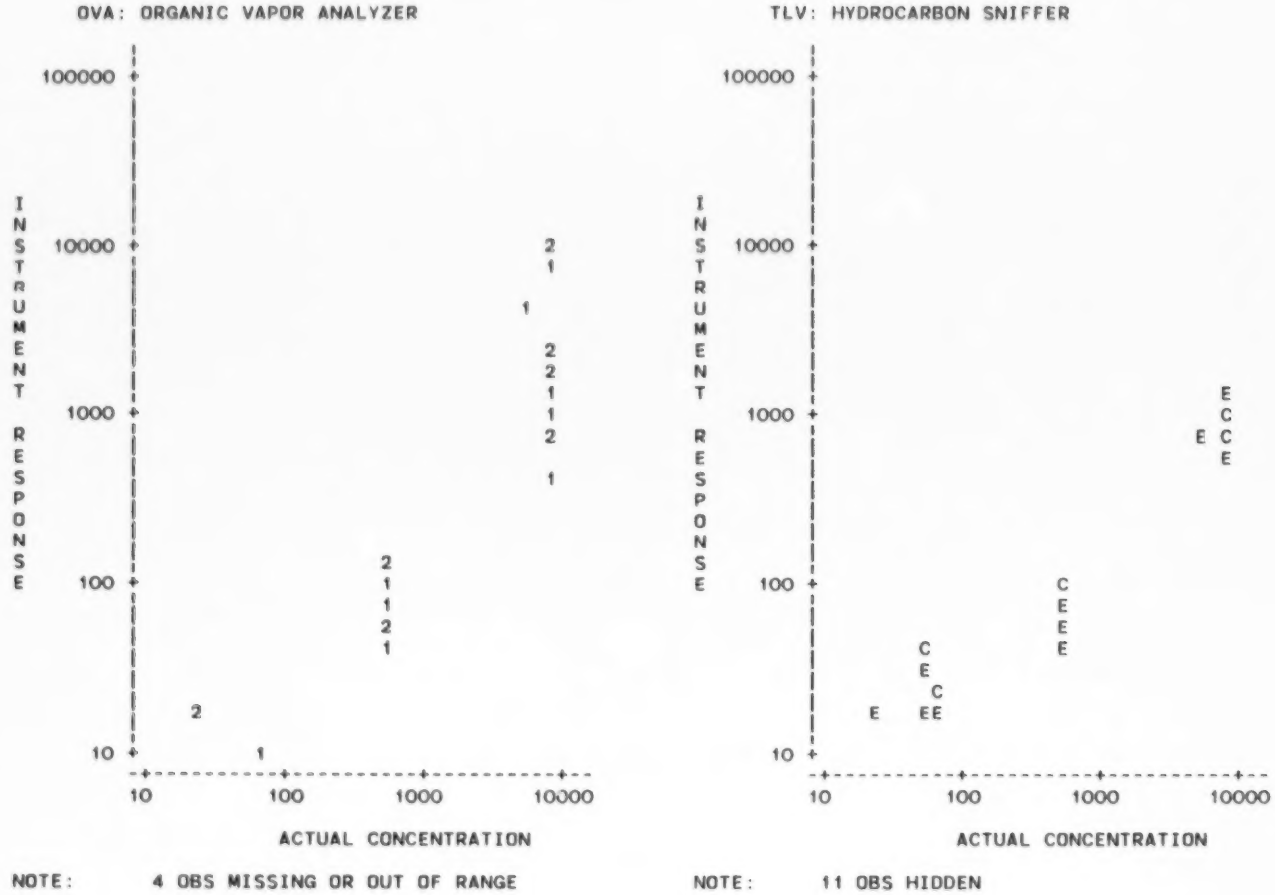


TABLE 5-155

RESPONSE FACTOR SUMMARY

TOLUENE

OVA INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	192	192	192	0.67	0.02	2	0.65		1	0.69		1						
1500	1524	1524	1524	0.49	0.02	2	0.46		1	0.51		1						
3000	3265	3265	3265	0.39	0.02	2	0.38		1	0.41		1						
4000	4344	4344	4344															
8000	7830	7830	7830															
	OVERALL MEANS			0.51	0.00	6	0.49	0.08	3	0.53	0.08	3						

ESTIMATED AT 10,000 PPMV 0.33 95 % CONFIDENCE INTERVAL : (0.29, 0.36)

TLV INSTRUMENTS

R E S P O N S E F A C T O R S

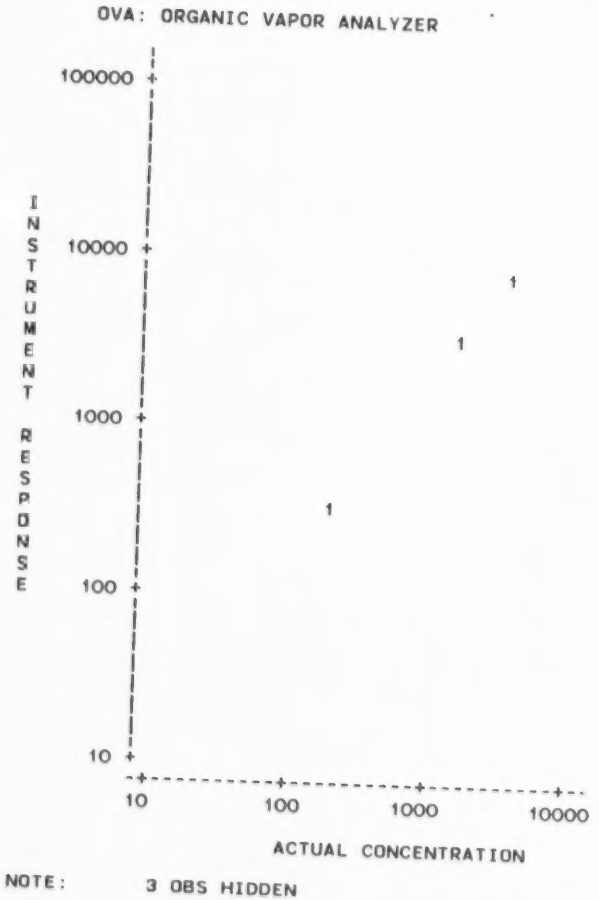
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	192	192	192	2.04	0.95	2	2.99		1	1.10		1						
1500	1524	1524	1524	4.49	2.48	2	6.97		1	2.01		1						
3000	3265	3265	3265	1.29		1				1.29		1						
4000	4344	4344	4344	4.72	3.43	2	8.15		1	1.29		1						
8000	7830	7830	7830	5.33	3.91	2	9.24		1	1.41		1						
	OVERALL MEANS			3.83	0.30	9	6.84	1.36	4	1.42	0.16	5						

ESTIMATED AT 10,000 PPMV 2.32 95 % CONFIDENCE INTERVAL : (0.79, 6.82)

Figure 5-155

INSTRUMENT RESPONSE VS CONCENTRATION

TOLUENE



NOTE: 3 OBS HIDDEN

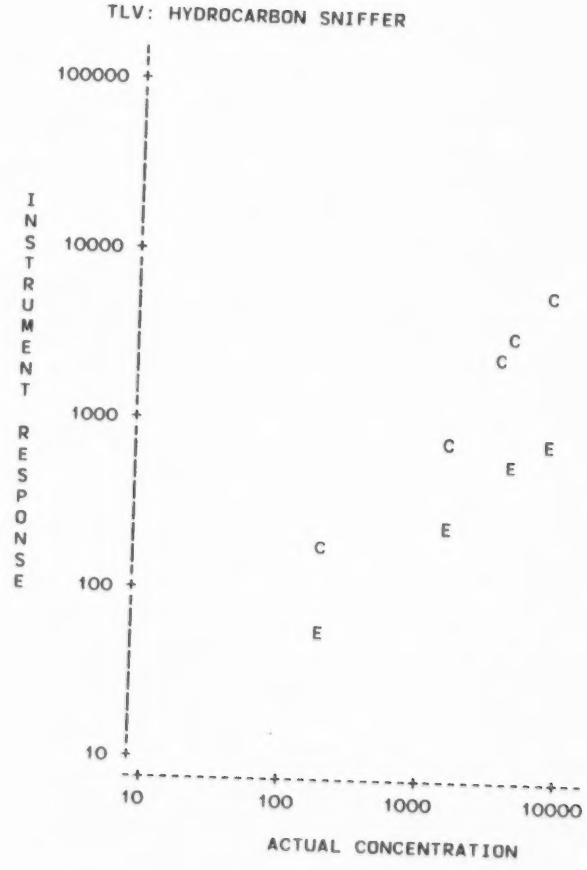


TABLE 5-156

RESPONSE FACTOR SUMMARY

TRICHLOROBENZENE,1,2,4-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	208	208	208	1.41		1							1.41		1			
600	586	586	586	1.08		1							1.08		1			
1000	976	976	976	1.55		1							1.55		1			
		OVERALL MEANS		1.35		3							1.35	0.14	3			

ESTIMATED AT 10,000 PPMV 1.35 95 % CONFIDENCE INTERVAL : (0.13,14.00)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	208	208	208	1.07		1				1.07		1						
600	586	586	586	0.70		1				0.70		1						
1000	976	976	976	0.77		1				0.77		1						
		OVERALL MEANS		0.84		3				0.84	0.11	3						

ESTIMATED AT 10,000 PPMV 0.39 95 % CONFIDENCE INTERVAL : (0.10, 1.57)

Figure 5-156

INSTRUMENT RESPONSE VS CONCENTRATION

TRICHLOROBENZENE,1,2,4-

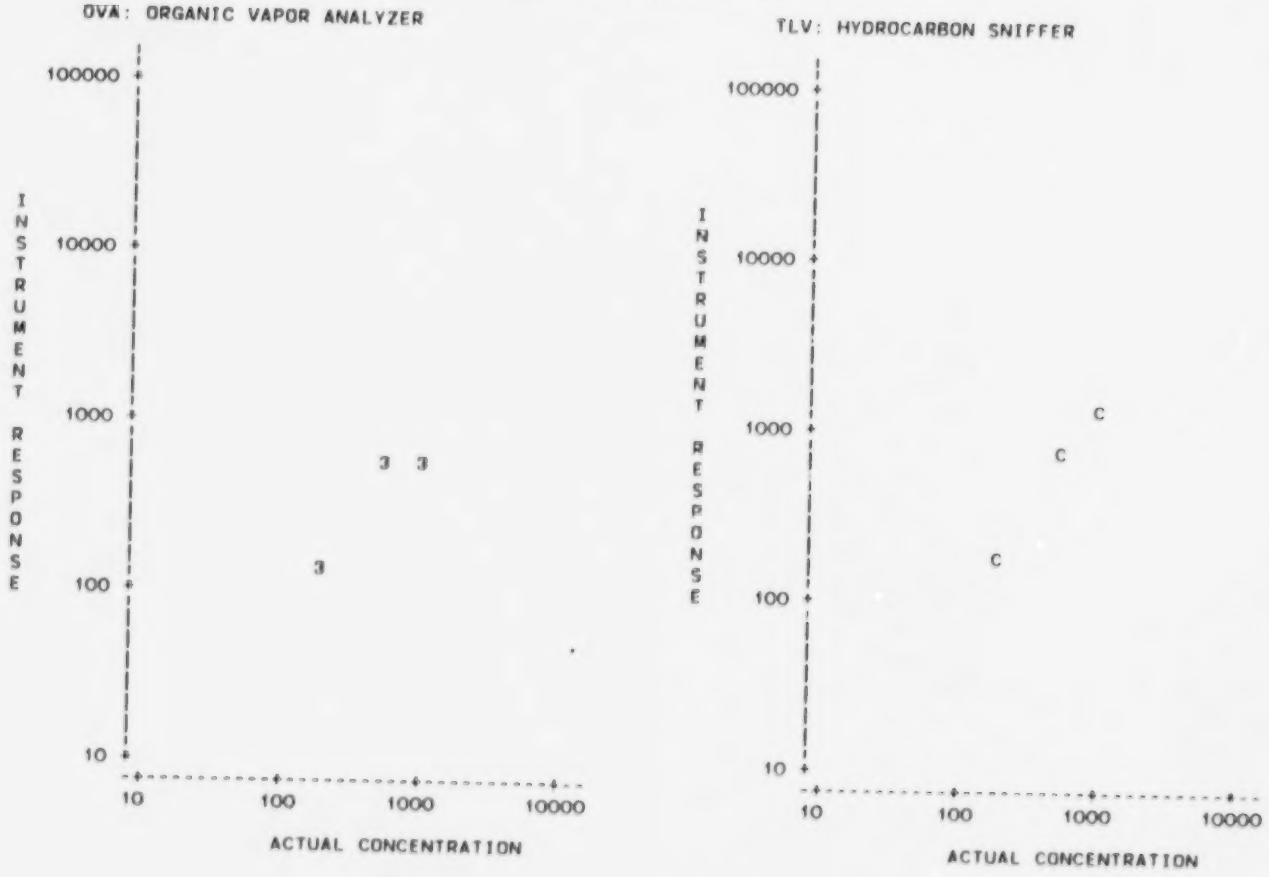


TABLE 5-157

RESPONSE FACTOR SUMMARY

TRICHLOROETHANE,1,1,1-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	218	218	218	1.11	0.05	2	1.05		1	1.16		1						
1500	1390	1390	1390	0.95	0.08	2	0.87		1	1.03		1						
8000	7706	7706	7706	0.81	0.01	2	0.79		1	0.82		1						
		OVERALL MEANS		0.95	0.01	6	0.91	0.08	3	1.00	0.10	3						

ESTIMATED AT 10,000 PPMV 0.79 95 % CONFIDENCE INTERVAL : (0.70, 0.89)

TLV INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	218	218	218	2.53	0.37	2	2.90		1	2.16		1						
1500	1390	1390	1390	2.37	0.17	2	2.54		1	2.20		1						
8000	7706	7706	7706	2.47	0.06	2	2.53		1	2.41		1						
		OVERALL MEANS		2.46	0.03	6	2.66	0.12	3	2.26	0.08	3						

ESTIMATED AT 10,000 PPMV 2.41 95 % CONFIDENCE INTERVAL : (1.96, 2.96)

Figure 5-157

INSTRUMENT RESPONSE VS CONCENTRATION

TRICHLOROETHANE, 1, 1, 1-

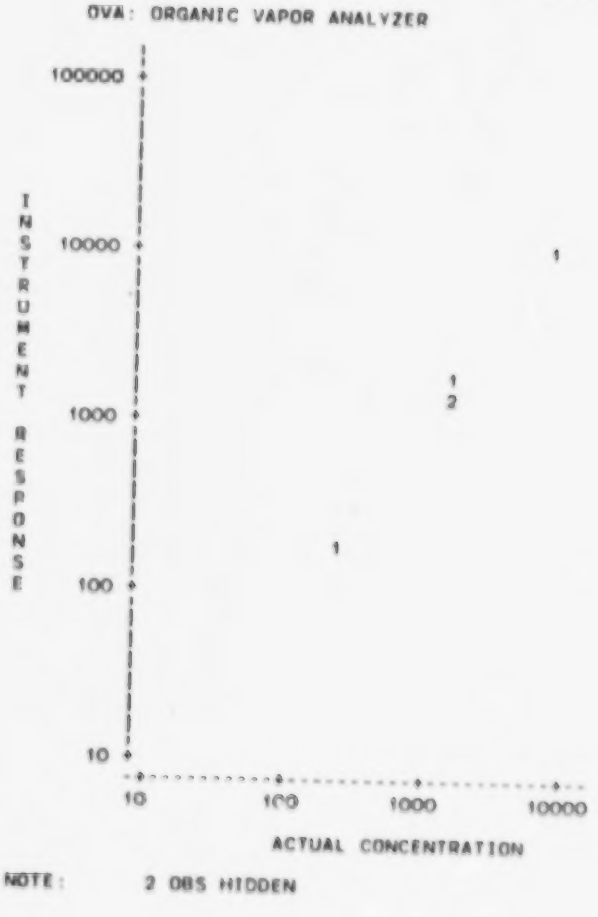


TABLE 5-158

RESPONSE FACTOR SUMMARY

TRICHLOROETHANE, 1,1,2-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS: 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	220	220	220	1.60	0.16	2	1.43		1	1.76		1						
1500	1410	1410	1410	1.43	0.11	2	1.32		1	1.54		1						
8000	7917	7917	7917	1.28	0.05	2	1.26		1	1.31		1						
		OVERALL MEANS		1.44	0.02	6	1.34	0.05	3	1.54	0.13	3						

ESTIMATED AT 10,000 PPMV 1.26

95 % CONFIDENCE INTERVAL : (1.08, 1.47)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS: 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	220	220	220	3.75	0.48	2	4.24		1	3.27		1						
1500	1410	1410	1410	3.61	0.28	2	3.89		1	3.32		1						
8000	7917	7917	7917	3.75	0.05	2	3.80		1	3.70		1						
		OVERALL MEANS		3.70	0.05	6	3.98	0.13	3	3.43	0.14	3						

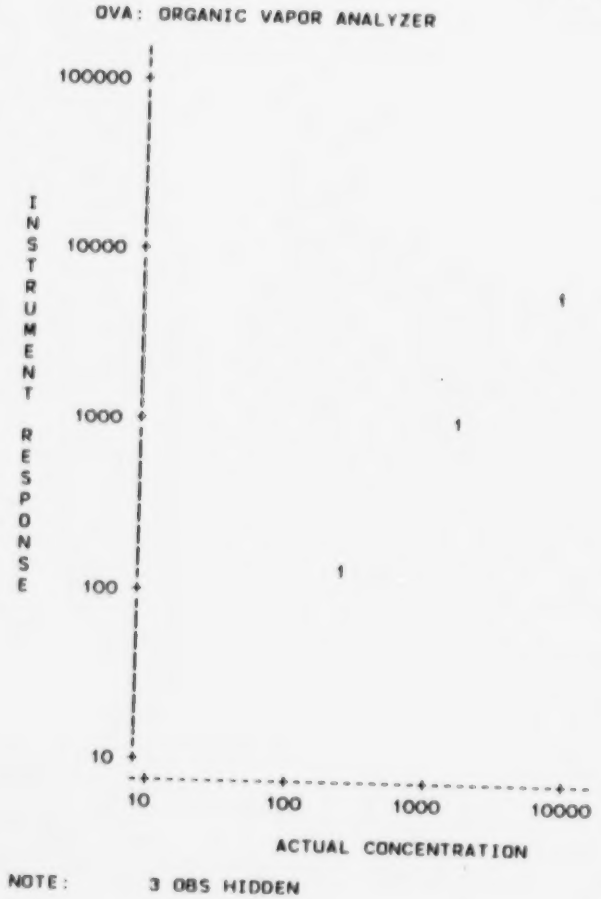
ESTIMATED AT 10,000 PPMV 3.68

95 % CONFIDENCE INTERVAL : (3.05, 4.43)

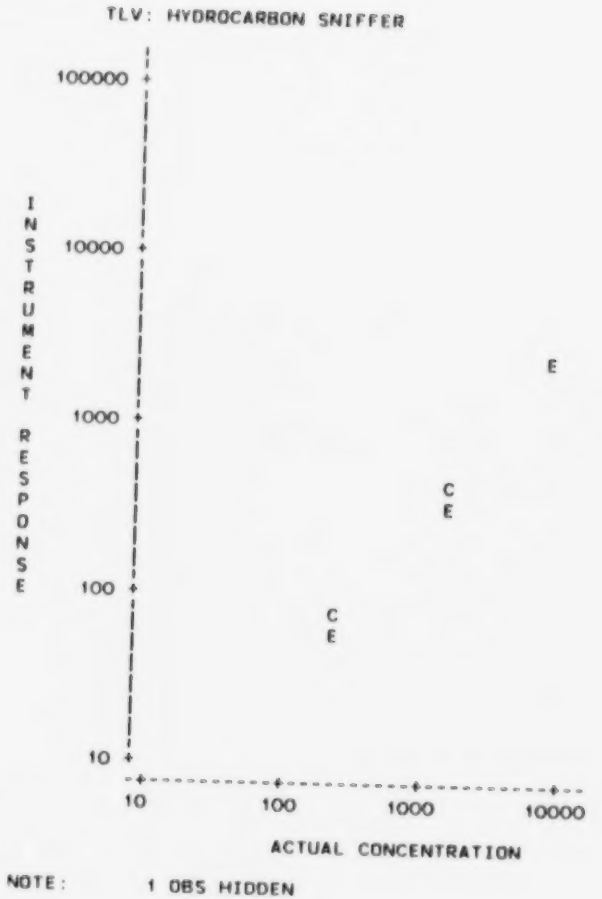
Figure 5-158

INSTRUMENT RESPONSE VS CONCENTRATION

TRICHLOROETHANE,1,1,2-



NOTE: 3 OBS HIDDEN



NOTE: 1 OBS HIDDEN

TABLE 5-159

RESPONSE FACTOR SUMMARY

TRICHLOROETHYLENE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL	ACTUAL PPMV			OVERALL			OVA METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	205	205	205	1.87	0.08	2	1.78		1	1.95		1						
1500	1549	1549	1549	1.43	0.05	2	1.38		1	1.48		1						
8000	7967	7967	7967	0.94	0.06	2	0.89		1	1.00		1						
		OVERALL MEANS		1.41	0.01	6	1.35	0.26	3	1.48	0.28	3						

ESTIMATED AT 10,000 PPMV 0.94 95 % CONFIDENCE INTERVAL : (0.81, 1.08)

TLV INSTRUMENTS

RESPONSE FACTORS

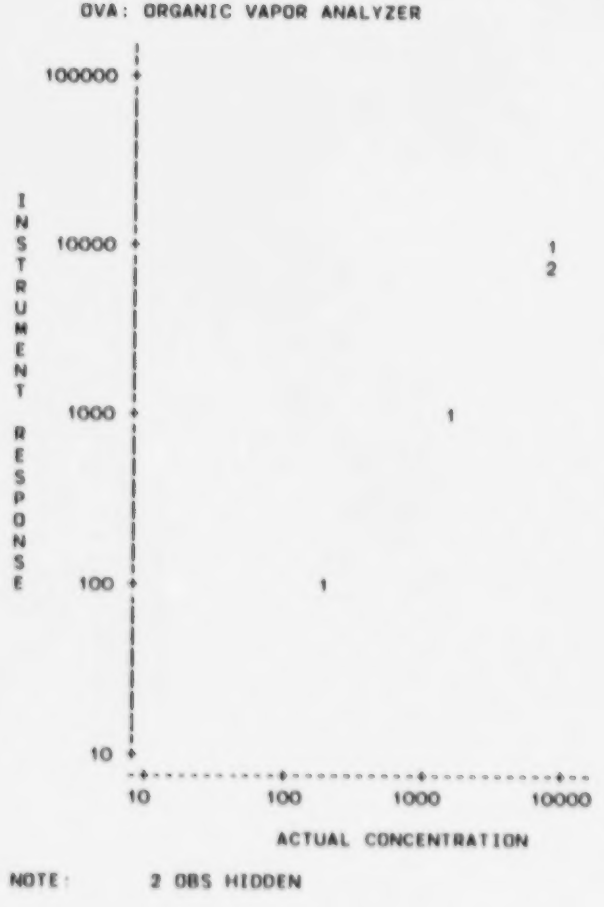
NOMINAL	ACTUAL PPMV			OVERALL			TLV METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	205	205	205	2.18	0.40	2	2.58		1	1.78		1						
1500	1549	1549	1549	2.73	0.10	2	2.83		1	2.63		1						
8000	7967	7967	7967	3.29	0.04	2	3.33		1	3.25		1						
		OVERALL MEANS		2.73	0.03	6	2.92	0.22	3	2.55	0.42	3						

ESTIMATED AT 10,000 PPMV 3.35 95 % CONFIDENCE INTERVAL : (2.68, 4.19)

Figure 5-159

INSTRUMENT RESPONSE VS CONCENTRATION

TRICHLOROETHYLENE



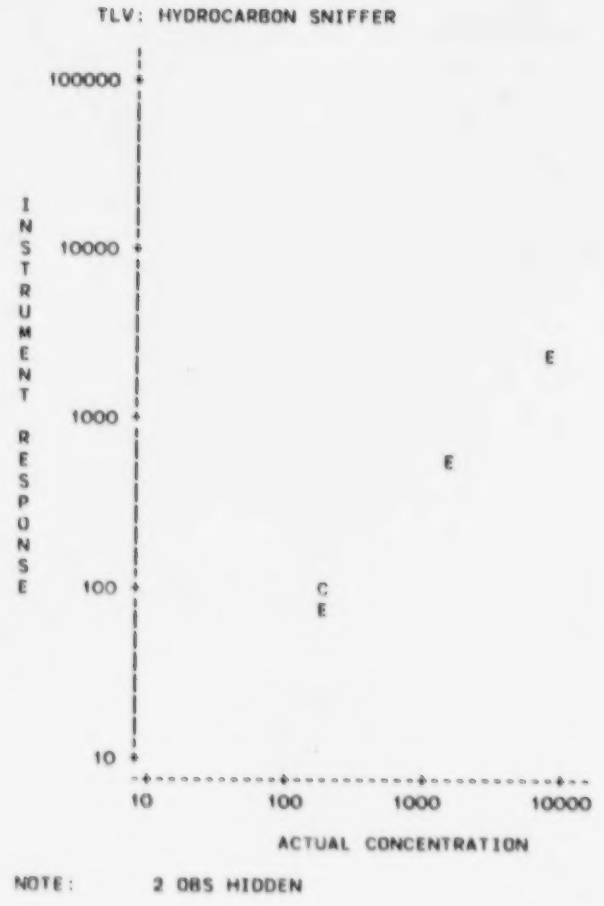


TABLE 5-160

RESPONSE FACTOR SUMMARY

TRICHLOROPROPANE,1,2,3-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	532	532	532	3.19	0.48	2	2.72		1	3.67		1						
1500	1518	1518	1518	1.35	0.18	2	1.17		1	1.53		1						
8000	8099	8099	8099	1.22	0.07	2	1.15		1	1.29		1						
			OVERALL MEANS	1.92	0.04	6	1.68	0.52	3	2.16	0.76	3						

ESTIMATED AT 10,000 PPMV 0.95 95 % CONFIDENCE INTERVAL : (0.54, 1.69)

TLV INSTRUMENTS

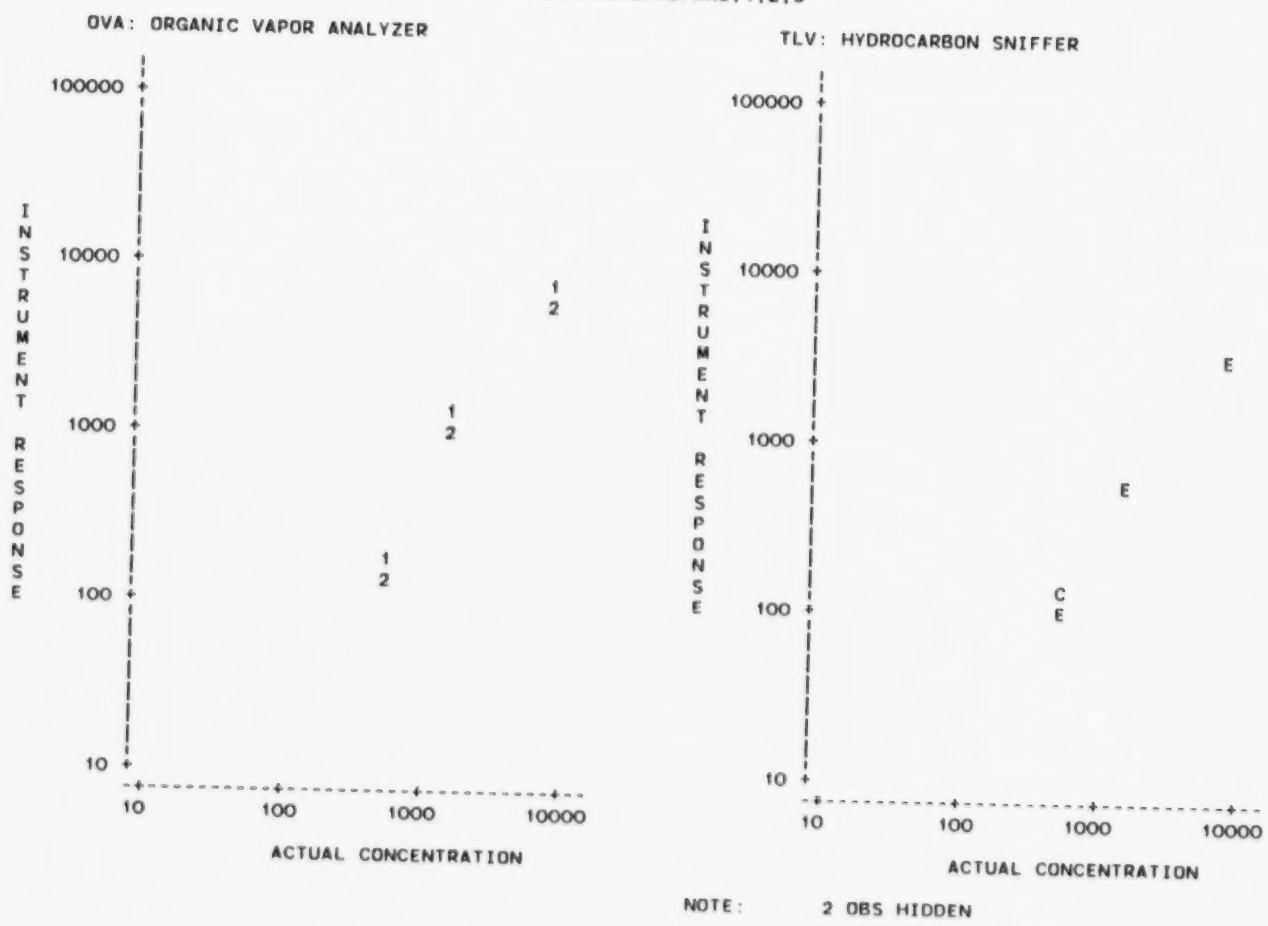
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	532	532	532	4.41	0.28	2	4.69		1	4.12		1						
1500	1518	1518	1518	2.43	0.10	2	2.52		1	2.33		1						
8000	8099	8099	8099	2.63	0.00	2	2.63		1	2.62		1						
			OVERALL MEANS	3.15	0.02	6	3.28	0.70	3	3.03	0.56	3						

ESTIMATED AT 10,000 PPMV 2.23 95 % CONFIDENCE INTERVAL : (1.47, 3.40)

Figure 5-160

INSTRUMENT RESPONSE VS CONCENTRATION

TRICHLOROPROPANE,1,2,3-



NOTE: 2 OBS HIDDEN

TABLE 5-161

RESPONSE FACTOR SUMMARY

TRIETHYLAMINE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	198	198	198	0.82	0.00	2	0.82		1	0.82		1						
1500	1523	1523	1523	0.77	0.01	2	0.75		1	0.78		1						
4000	3844	3844	3844	0.48	0.00	2	0.47		1	0.48		1						
6000	6209	6209	6209															
8000	7967	7967	7967															
OVERALL MEANS				0.69	0.00	6	0.68	0.11	3	0.70	0.11	3						

ESTIMATED AT 10,000 PPMV 0.46

95 % CONFIDENCE INTERVAL : (0.32, 0.67)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	198	198	198	0.79		1										0.79		1
1500	1523	1523	1523	1.37		1										1.37		1
4000	3844	3844	3844	1.36		1										1.36		1
6000	6209	6209	6209	1.41		1										1.41		1
8000	7967	7967	7967	1.13		1										1.13		1
OVERALL MEANS				1.21		5										1.21	0.12	5

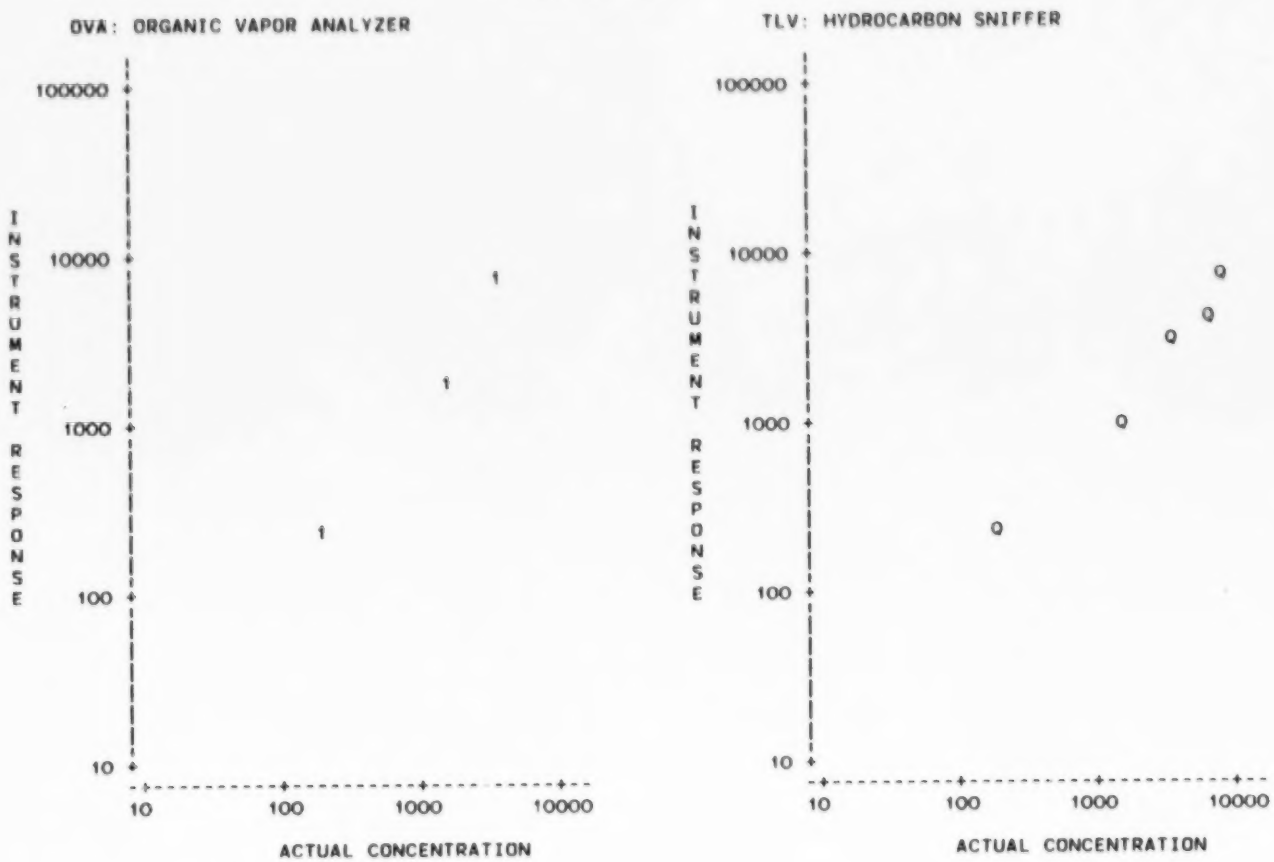
ESTIMATED AT 10,000 PPMV 1.41

95 % CONFIDENCE INTERVAL : (1.03, 1.92)

Figure 5-161

INSTRUMENT RESPONSE VS CONCENTRATION

TRIETHYLAMINE



NOTE: 3 OBS HIDDEN

TABLE 5-162

RESPONSE FACTOR SUMMARY

VINYL ACETATE

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	214	214	214	1.97	0.10	2	1.87		1	2.07		1						
1500	1547	1547	1547	2.05	0.12	2	1.92		1	2.17		1						
8000	8154	8154	8154	1.23	0.03	2	1.20		.1	1.26		1						
		OVERALL MEANS		1.75	0.01	6	1.67	0.23	3	1.83	0.29	3						

ESTIMATED AT 10,000 PPMV 1.31 95 % CONFIDENCE INTERVAL : (0.97, 1.76)

TLV INSTRUMENTS

RESPONSE FACTORS

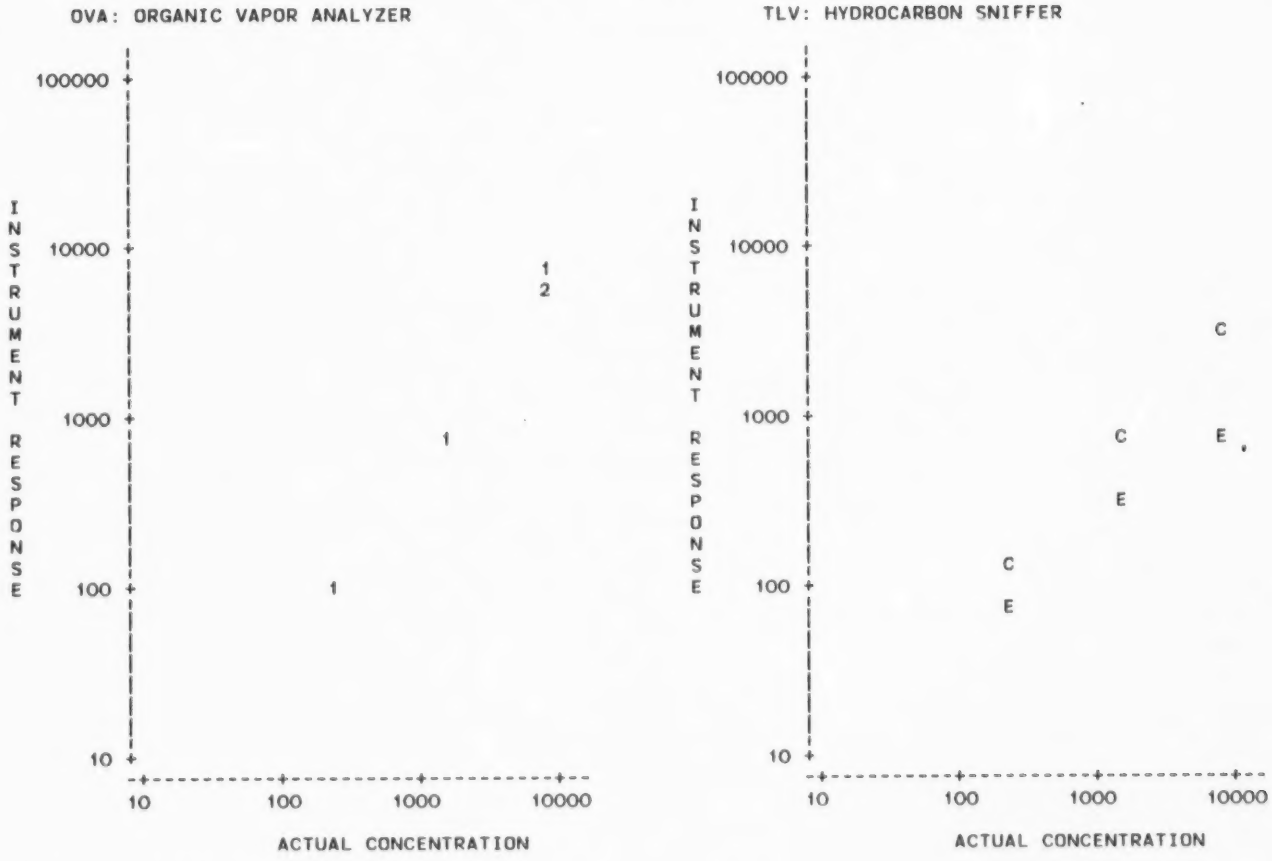
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	214	214	214	2.14	0.47	2	2.61		1	1.67		1						
1500	1547	1547	1547	3.22	1.22	2	4.44		1	2.01		1						
8000	8154	8154	8154	5.90	3.57	2	9.47		1	2.32		1						
		OVERALL MEANS		3.75	0.29	6	5.50	2.05	3	2.00	0.19	3						

ESTIMATED AT 10,000 PPMV 3.99 95 % CONFIDENCE INTERVAL : (1.49,10.69)

Figure 5-162

INSTRUMENT RESPONSE VS CONCENTRATION

VINYL ACETATE



NOTE: 2 OBS HIDDEN

TABLE 5-163

RESPONSE FACTOR SUMMARY

VINYL CHLORIDE

OVA INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
1000	864	864	864	22.45		1							22.45		1			
4500	4263	4263	4263	2.09		1							2.09		1			
8000	7227	7227	7227	1.10		1							1.10		1			
		OVERALL MEANS		8.54		3							8.54	6.96	3			

ESTIMATED AT 10,000 PPMV 0.65 95 % CONFIDENCE INTERVAL : (0.50, 0.84)

TLV INSTRUMENTS

R E S P O N S E F A C T O R S

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
1000	864	864	864	7.20		1				7.20		1						
4500	4263	4263	4263	1.94		1				1.94		1						
8000	7227	7227	7227	1.51		1				1.51		1						
		OVERALL MEANS		3.55		3				3.55	1.83	3						

ESTIMATED AT 10,000 PPMV 1.10 95 % CONFIDENCE INTERVAL : (0.79, 1.55)

Figure 5-163

INSTRUMENT RESPONSE VS CONCENTRATION

VINYL CHLORIDE

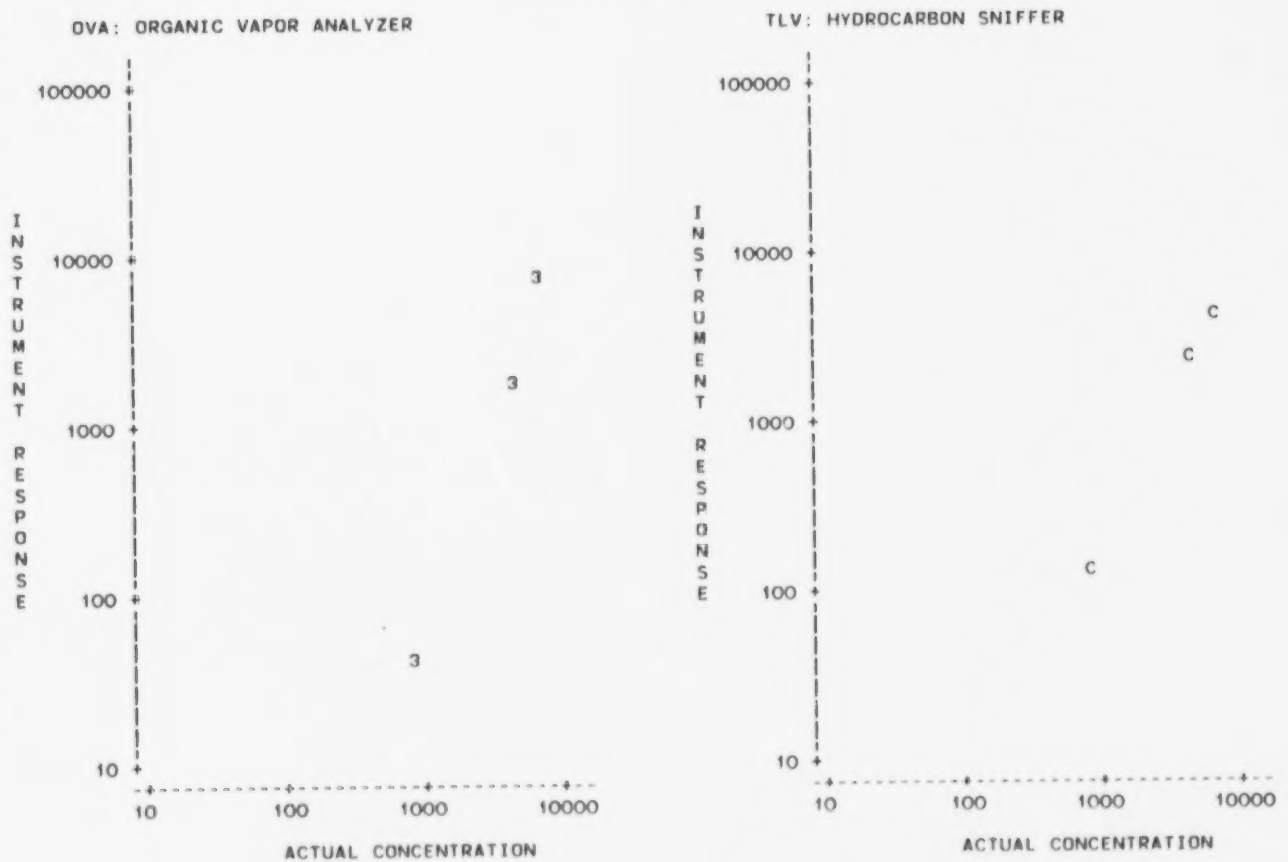


TABLE 5-164

RESPONSE FACTOR SUMMARY

VINYL PROPIONATE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	232	232	232	1.30		1							1.30		1			
1500	1570	1570	1570	1.51		1							1.51		1			
8000	8728	8728	8728	0.88		1							0.88		1			
		OVERALL MEANS		1.23		3							1.23	0.18	3			

ESTIMATED AT 10,000 PPMV 0.94 95 % CONFIDENCE INTERVAL : (0.40, 2.23)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	232	232	232	231.5		1				231.5		1						
1500	1570	1570	1570	5.32		1				5.32		1						
8000	8728	8728	8728	2.69		1				2.69		1						
		OVERALL MEANS		79.84		3				79.84	75.8	3						

ESTIMATED AT 10,000 PPMV 0.70 95 % CONFIDENCE INTERVAL : (0.02,22.87)

Figure 5-164

INSTRUMENT RESPONSE VS CONCENTRATION

VINYL PROPIONATE

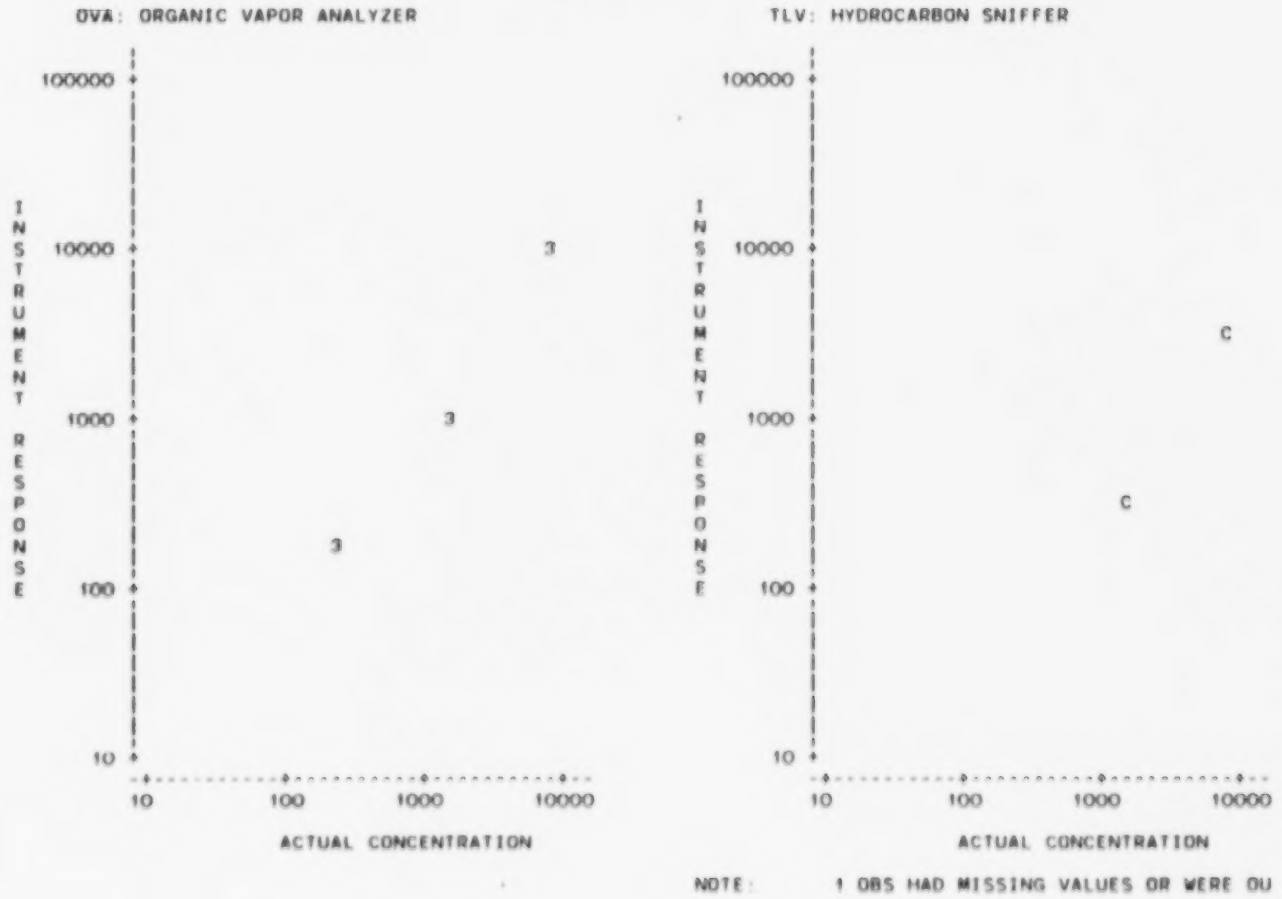


TABLE 5-165

RESPONSE FACTOR SUMMARY

VINYLIDENE CHLORIDE

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	275	275	275	2.53	0.04	2	2.57		1	2.50		1						
1500	1637	1637	1637	2.18	0.04	2	2.22		1	2.14		1						
8000	8141	8141	8141	1.11	0.08	2	1.20		1	1.03		1						
			OVERALL MEANS	1.94	0.01	6	2.00	0.41	3	1.89	0.44	3						

ESTIMATED AT 10,000 PPMV 1.15 95 % CONFIDENCE INTERVAL : (0.86, 1.54)

TLV INSTRUMENTS

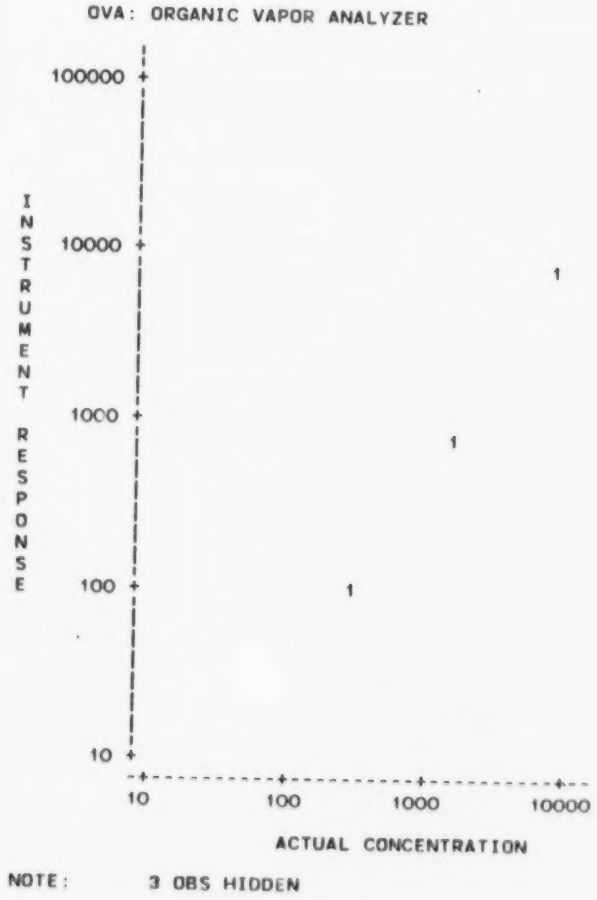
NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS — TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	275	275	275	2.19	0.21	2	2.39		1	1.98		1						
1500	1637	1637	1637	2.60	0.12	2	2.72		1	2.48		1						
8000	8141	8141	8141	2.26	0.03	2	2.29		1	2.23		1						
			OVERALL MEANS	2.35	0.02	6	2.47	0.13	3	2.23	0.14	3						

ESTIMATED AT 10,000 PPMV 2.38 95 % CONFIDENCE INTERVAL : (1.95, 2.90)

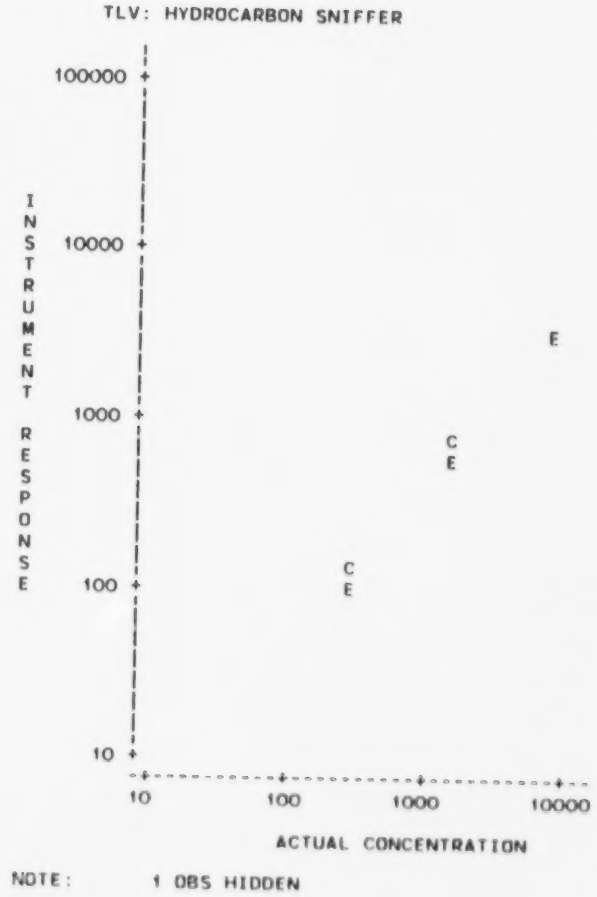
Figure 5-165

INSTRUMENT RESPONSE VS CONCENTRATION

VINYLIDENE CHLORIDE



NOTE: 3 OBS HIDDEN



NOTE: 1 OBS HIDDEN

TABLE 5-166

RESPONSE FACTOR SUMMARY

XYLENE, P-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL	ACTUAL PPMV			OVERALL			OVA METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
50	45	55	51	3.49	0.43	5	2.96	0.07	2	3.84	0.60	3						
500	541	643	576	3.70	0.34	6	3.36	0.55	3	4.04	0.40	3						
7700	8316	8611	8412	2.27	0.06	7	2.20	0.25	3	2.32	0.34	4						
			OVERALL MEANS	3.08	0.01	18	2.83	0.28	8	3.29	0.35	10						

ESTIMATED AT 10,000 PPMV 2.27 95 % CONFIDENCE INTERVAL : (1.87, 2.76)

TLV INSTRUMENTS

RESPONSE FACTORS

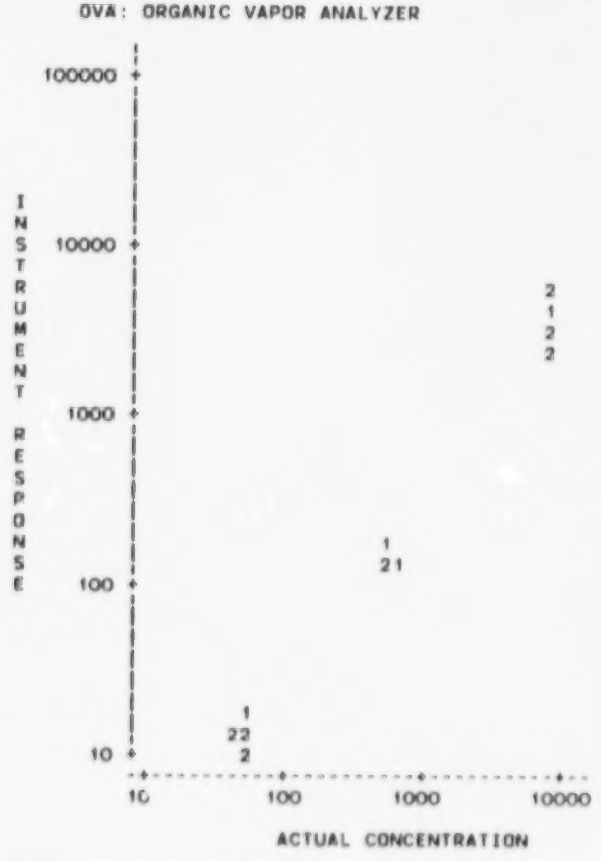
NOMINAL	ACTUAL PPMV			OVERALL			TLV METERS											
PPMV	LOW	HIGH	MEAN	MEAN	SE	N	7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
50	45	55	51	1.91	0.48	5	2.50	0.01	2	1.51	0.08	3						
500	541	643	576	6.71	2.73	6	9.43	2.47	3	3.98	1.06	3						
7700	8316	8611	8412	5.81	1.43	6	7.83	4.33	2	4.80	1.24	4						
			OVERALL MEANS	4.98	0.10	17	7.00	1.78	7	3.57	0.70	10						

ESTIMATED AT 10,000 PPMV 5.35 95 % CONFIDENCE INTERVAL : (3.34, 8.58)

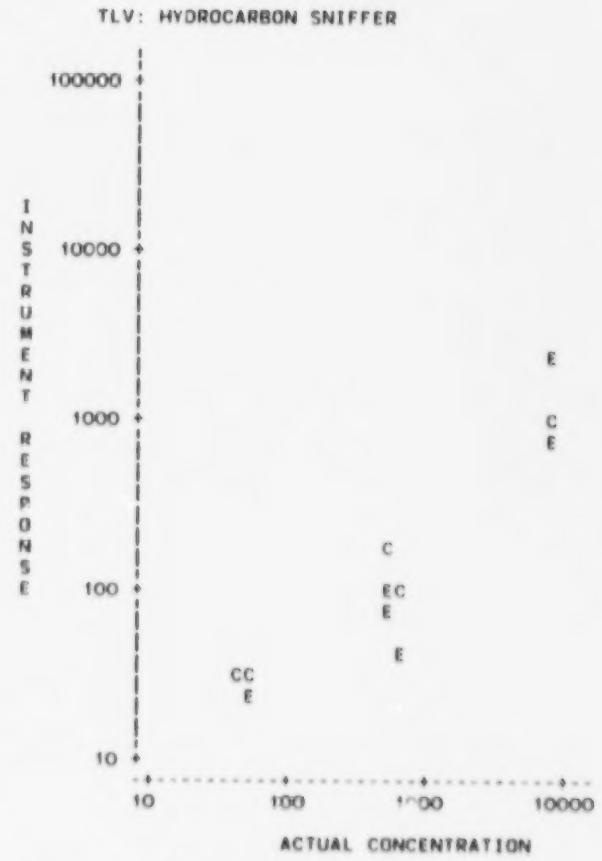
Figure 5-166

INSTRUMENT RESPONSE VS CONCENTRATION

XYLENE, P-



NOTE: 7 OBS HIDDEN



NOTE: 6 OBS HIDDEN

TABLE 5-167

RESPONSE FACTOR SUMMARY

XYLENE,M-

OVA INSTRUMENTS

RESPONSE FACTORS

NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	203	203	203	1.04	0.05	2	1.09		1	0.99		1						
1500	1548	1548	1548	0.60	0.02	2	0.57		1	0.62		1						
3000	2984	2984	2984	0.42	0.00	2	0.42		1	0.42		1						
4500	4513	4513	4513															
7000	7762	7762	7762															
			OVERALL MEANS	0.69	0.00	6	0.69	0.20	3	0.68	0.17	3						

ESTIMATED AT 10,000 PPMV 0.30 95 % CONFIDENCE INTERVAL : (0.25, 0.37)

TLV INSTRUMENTS

RESPONSE FACTORS

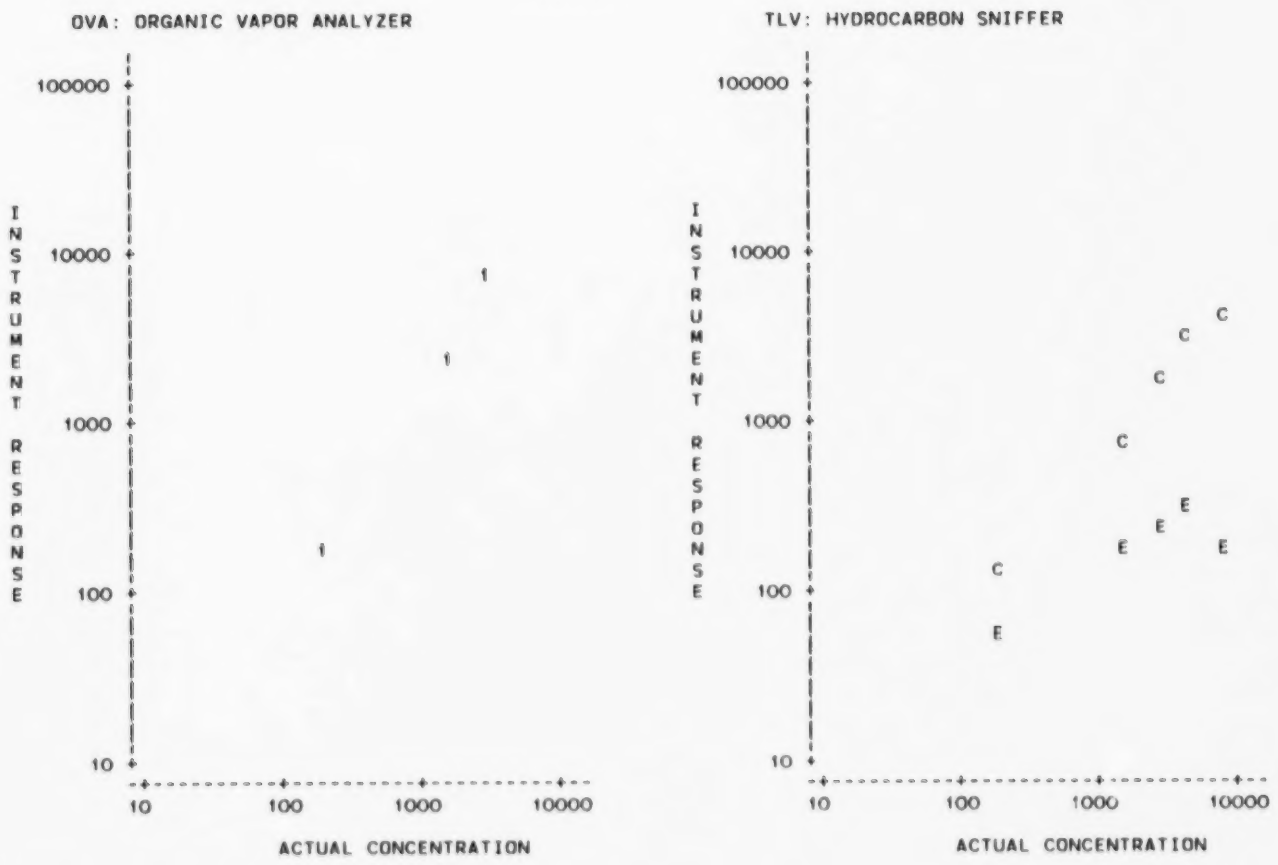
NOMINAL PPMV	ACTUAL PPMV LOW	HIGH	MEAN	OVERALL MEAN	SE	N	TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	203	203	203	2.61	0.91	2	3.53		1	1.70		1						
1500	1548	1548	1548	5.72	3.72	2	9.44		1	2.01		1						
3000	2984	2984	2984	7.24	5.60	2	12.84		1	1.64		1						
4500	4513	4513	4513	8.27	6.74	2	15.01		1	1.53		1						
7000	7762	7762	7762	19.79	18.1	2	37.86		1	1.73		1						
			OVERALL MEANS	8.73	0.70	10	15.73	5.86	5	1.72	0.08	5						

ESTIMATED AT 10,000 PPMV 3.56 95 % CONFIDENCE INTERVAL : (0.93,13.64)

Figure 5-167

INSTRUMENT RESPONSE VS CONCENTRATION

XYLENE,M-



NOTE: 3 OBS HIDDEN

TABLE 5-168

RESPONSE FACTOR SUMMARY

XYLENE,O-

OVA INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS OVA METERS 1080	SE	N	2254	SE	N	2159	SE	N	1813	SE	N
200	205	205	205	0.89	0.05	2	0.83		1	0.94		1						
1500	1533	1533	1533	0.86	0.05	2	0.81		1	0.90		1						
3000	2968	2968	2968	0.39	0.04	2	0.35		1	0.42		1						
5800	6268	6268	6268															
		OVERALL MEANS		0.71	0.01	6	0.66	0.16	3	0.76	0.17	3						

ESTIMATED AT 10,000 PPMV 0.36

95 % CONFIDENCE INTERVAL : (0.16, 0.77)

TLV INSTRUMENTS

NOMINAL PPMV	ACTUAL PPMV LOW	ACTUAL PPMV HIGH	ACTUAL PPMV MEAN	OVERALL MEAN	OVERALL SE	OVERALL N	RESPONSE FACTORS TLV METERS 7E	SE	N	7C	SE	N	7M	SE	N	7Q	SE	N
200	205	205	205	1.76		1				1.76		1						
1500	1533	1533	1533	1.09		1				1.09		1						
3000	2968	2968	2968	1.57		1				1.57		1						
5800	6268	6268	6268	1.70		1				1.70		1						
		OVERALL MEANS		1.53		4				1.53	0.15	4						

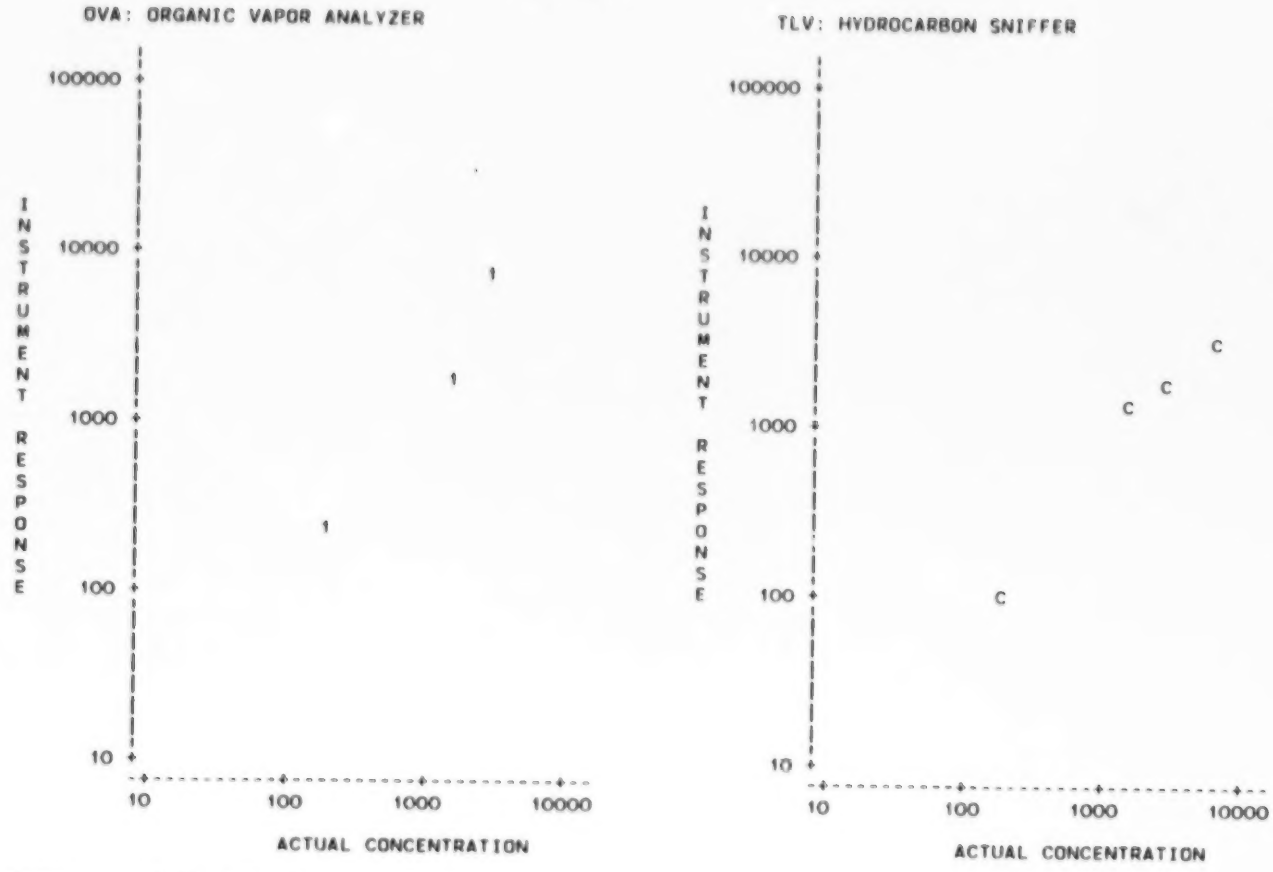
ESTIMATED AT 10,000 PPMV 1.40

95 % CONFIDENCE INTERVAL : (0.73, 2.70)

Figure 5-168

INSTRUMENT RESPONSE VS CONCENTRATION

XYLENE,O-



NOTE: 3 OBS HIDDEN

TABLE 5-169

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-OVA

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSX	XBAR
70	ACETIC ACID	LL	-2.8754	1.22149	23	0.677209	94.0588	6.71835
80	ACETIC ANHYDRIDE	LL	.375288	.925664	6	.0924492	8.75857	6.97689
90	ACETONE	LL	-.42601	1.06086	14	0.44568	56.4432	6.73273
100	ACETONE CYANOHYDRIN	HL	-1.0724	.980583	6	0.206338	1.07377	5.97147
110	ACETONITRILE	LL	-.80987	1.09408	6	.0616236	12.5475	7.23366
120	ACETOPHENONE	HL	-1.013	.817811	14	0.768287	62.071	6.71836
125	ACETYL CHLORIDE	LL	-.36506	.964417	6	.0778431	14.6944	7.21322
-	ACETYL-1-PROPANOL,3-	LL	1.07586	.611782	12	0.476851	50.5077	6.46174
130	ACETYLENE	G	.485665	1.05433	6	.0377039	1.44015	7.44562
160	ACRYLIC ACID	LL	-1.627	1.0091	6	0.112184	11.9679	7.31447
170	ACRYLONITRILE	LL	-.57262	1.06539	6	0.118698	14.1474	7.2202
-	ALLENE	G	-2.8183	1.37155	6	.0573086	4.4727	7.88619
200	ALLYL ALCOHOL	LL	-3.6	1.39534	6	0.192964	13.7776	7.22368
250	AMYL ALCOHOL,N-	HL	-2.3527	1.29529	6	0.131896	5.39958	6.68114
2855	AMYLENE	LL	-2.5916	1.40493	6	0.231679	8.23563	7.0079
330	ANISOLE	LL	.083984	.998552	6	0.166868	8.64685	6.92252
360	BENZALDEHYDE	HL	-.44202	.953919	6	0.114793	3.55556	6.34483
380	BENZENE	LL	-.87171	1.26135	31	0.148218	51.4347	6.63953
450	BENZONITRILE	HL	1.60572	.735434	12	0.226988	6.18285	6.08178
490	BENZOYL CHLORIDE	HL	1.74643	.599652	6	0.410048	13.2587	7.18737
530	BENZYL CHLORIDE	HL	2.76717	.528787	12	0.511603	21.483	8.00839
570	BROMOBENZENE	LL	-.04983	1.11651	6	0.11169	7.72926	6.8984
590	BUTADIENE,1,3-	G	-5.7128	1.72671	6	.0471682	3.14273	7.7553
-	BUTANE,N-	G	-2.9002	1.42036	10	0.130245	3.61904	8.06308
640	BUTANOL,N	LL	-.96371	1.06262	3	0.233069	6.0393	7.04506
650	BUTANOL,SEC-	LL	-2.4932	1.30867	6	.0571548	10.6652	7.1325
660	BUTANOL,TERT	S	-1.7618	1.27647	6	0.248874	8.58158	7.03513
592	BUTENE,1-	G	-.75886	1.15507	6	.0686523	4.98197	7.7713
600	BUTYL ACETATE,	LL	-1.5906	1.22728	6	0.149389	11.2932	7.15691
630	BUTYL ACRYLATE,N-	LL	-1.6738	1.22939	6	.0703242	9.90051	7.02981

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

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TABLE 5-169 (continued)

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-OVA

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSX	XBAR
-	BUTYL ETHER,N	LL	-1.3459	1.03767	3	0.114048	6.2084	7.50326
-	BUTYL ETHER,SEC	LL	-1.2453	1.27583	4	0.286528	4.87663	7.17385
670	BUTYLAMINE,N-	LL	-2.0713	1.27286	6	0.212276	11.2392	7.13838
680	BUTYLAMINE,SEC-	LL	-.90586	1.1415	6	0.13293	12.27	7.15
690	BUTYLAMINE,TERT-	LL	-1.2282	1.19206	6	.0627487	11.0874	7.17992
-	BUTYLBENZENE,TERT-	HL	.985678	.864887	6	0.186581	13.8471	7.21205
750	BUTYRALDEHYDE N-	LL	-2.8809	1.27649	6	0.126596	12.3356	7.29208
760	BUTYRIC ACID	HL	-2.9839	1.35542	6	0.143141	.946825	5.84132
780	BUTYRONITRILE	LL	-.92245	1.18116	6	0.203173	9.07656	7.0786
790	CARBON DISULFIDE	LL	-2.1633	.535771	6	0.424013	12.8302	7.22315
810	CARBON TETRACHLORIDE	LL	2.13296	.427673	6	0.400795	13.7915	7.20605
830	CHLOROACETALDEHYDE	LL	-4.2311	1.17545	8	0.198182	12.6252	7.1765
890	CHLOROBENZENE	LL	.590851	1.04424	10	0.15665	11.8805	6.68244
1740	CHLOROETHANE	G	1.32501	0.5541	8	2.52458	40.5528	6.09409
930	CHLOROFORM	LL	1.50605	0.67282	6	0.132055	13.3425	7.20212
960	CHLOROPHENOL,O-	HL	.679952	.793318	6	0.202122	5.50648	6.66217
-	CHLOROPROPENE, 1-	LL	-2.2543	1.30157	7	.0754264	12.5689	7.30057
210	CHLOROPROPENE, 3-	LL	-2.3441	1.2843	12	0.136945	52.1424	6.45557
970	CHLOROTOLUENE,M-	LL	-.46281	1.14167	6	0.039029	7.74444	6.9301
980	CHLOROTOLUENE,O-	LL	0.09082	1.07555	6	0.0746	7.74409	6.88833
990	CHLOROTOLUENE,P-	LL	-.48446	1.12273	6	.0479559	7.70788	6.93231
1010	CRESOL,O-	S	-4.3483	1.4774	6	0.111396	2.9799	6.30801
1040	CROTONALDEHYDE	LL	-2.5728	1.24273	8	0.351319	12.9835	7.24563
1060	CUMENE	LL	-1.2383	1.04932	12	0.509365	51.1558	6.46426
1120	CYCLOHEXANE	LL	-2.0872	1.33603	6	0.146801	7.77672	6.96164
1130	CYCLOHEXANOL	HL	-2.0239	1.24055	6	.0899117	3.57046	6.28751
1140	CYCLOHEXANONE	LL	-.38416	.995445	6	0.205081	10.3796	7.06142
1150	CYCLOHEXENE	LL	-1.4625	1.25627	7	0.125436	10.0889	7.13077
1160	CYCLOHEXYLAMINE	LL	-2.4639	1.34576	6	0.267438	9.7518	7.07654
-	DECANE	HL	-14.781	3.45409	6	0.906647	.701072	5.67254
1190	DIACETONE ALCOHOL	HL	-1.7754	1.14617	6	0.109833	3.44138	6.4446

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 5-169 (continued)

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-OVA

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSX	XBAR
-	DIACETYL	LL	-1.5731	1.11652	12	0.204878	49.1017	6.60012
-	DICHLORO-1-PROPANOL,2,3-	LL	-3.0521	.873976	6	0.432654	13.6007	7.23629
1270	DICHLORO-1-PROPENE,2,3-	LL	-1.9415	1.24672	6	0.217292	11.2697	7.10441
-	DICHLORO-2-PROPANOL,1,3-	LL	-.79172	0.70996	8	0.410248	15.4488	7.55474
1215	DICHLOROBENZENE,M-	HL	.986623	.937663	6	.0547674	5.4863	6.59837
1216	DICHLOROBENZENE,O-	HL	1.10876	.917648	6	.0947496	3.19816	6.33962
-	DICHLOROETHANE,1,1-	LL	-.00758	1.02819	6	0.130716	10.5488	7.11116
1244	DICHLOROETHANE,1,2-	LL	-.30622	1.03745	6	0.131104	14.1446	7.2661
1235	DICHLOROETHYLENE,CIS1,2-	LL	-1.4618	1.12855	8	0.15056	15.325	7.54257
1236	DICHLOROETHYLENE,TRANS1,2	LL	-2.0185	1.20515	8	.0862401	13.1057	7.02025
2620	DICHLOROMETHANE	LL	1.0934	.792123	6	.0915693	13.1072	7.23499
3110	DICHLOROPROPANE,1,2-	LL	-.88505	1.09215	6	0.123334	10.8605	7.1272
1440	DIISOBUTYLENE	LL	-2.0148	1.37176	6	0.165233	7.56692	6.9367
-	DIISOPROPYL BENZENE,1,3-	LL	1.76459	.547649	6	0.561958	28.5679	6.27642
1870	DIMETHOXY ETHANE,1,2-	LL	-2.536	1.23573	6	0.483998	13.2176	7.19222
1490	DIMETHYLFORMAMIDE,N,N-	LL	-.87643	.947127	6	0.109855	9.19596	7.02873
1495	DIMETHYLHYDRAZINE 1,1-	LL	-3.7531	1.40074	6	0.230674	13.1967	7.26392
-	DIMETHYLSTYRENE,2,4-	LL	-1.5367	.771785	6	0.224922	13.6858	7.28067
1520	DIMETHYLSULFOXIDE	HL	-16.573	3.43902	6	1.0935	.409881	5.66978
1480	DIOXANE	LL	-2.0521	1.17043	6	0.215831	13.0262	7.20306
1650	EPICHLOROHYDRIN	LL	-.75538	1.02334	6	.0376406	13.356	7.22066
-	ETHANE	G	-2.0456	1.27648	6	0.325301	2.31961	7.84885
1660	ETHANOL	LL	-2.9244	1.23973	6	0.068237	15.4173	7.19679
1910	ETHOXY ETHANOL,2-	LL	-2.3344	1.19637	6	0.101094	9.75276	7.00472
1670	ETHYL ACETATE	LL	-1.2288	1.15152	18	0.15158	66.2747	6.71408
1680	ETHYL ACETOACETATE	HL	.494514	.825583	6	0.107831	3.5444	6.29103
1690	ETHYL ACRYLATE	LL	-2.1188	1.26487	6	0.144331	11.6226	7.14221
1750	ETHYL CHLOROACETATE	LL	-.60685	0.99184	6	.0551139	8.85726	6.99629
1990	ETHYL ETHER	LL	-1.8661	1.20484	6	0.155052	11.6344	7.12129
1710	ETHYLBENZENE	LL	-1.0274	1.13086	20	0.597093	66.947	6.80288
1770	ETHYLENE	G	-8.0566	1.94541	6	0.157469	3.84623	8.01344

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 5-169 (continued)

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-OVA

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSX	XBAR
1980	ETHYLENE OXIDE	G	-1.9953	1.10758	6	0.102798	4.79615	5.11482
1800	ETHYLENEDIAMINE	LL	-1.0209	1.04732	6	0.146117	12.4844	7.23272
2060	FORMIC ACID	LL	-6.6759	1.33858	6	0.107919	12.0961	7.24228
1221	FREON 12	G	1.31433	.609471	6	0.174541	7.09205	7.51936
2073	FURFURAL	HL	1.04653	.650043	6	0.452342	12.6998	7.21469
2105	GLYCIDOL	LL	-3.1147	1.10534	6	0.163724	4.78354	6.66621
-	HEPTANE	LL	-1.8365	1.32734	3	0.223944	3.74967	6.98098
-	HEXANE,N-	LL	-1.7626	1.31685	37	0.199415	40.4766	6.87982
-	HEXENE,1-	LL	-2.1275	1.33237	6	0.179963	7.54485	6.94449
-	HYDROXYACETONE	LL	-3.2967	1.12007	8	0.232517	15.5756	7.59178
-	ISOBUTANE	G	-2.2393	1.35824	8	0.557399	2.43992	7.90812
2200	ISOBUTYLENE	G	1.16949	.775741	6	0.147294	2.43034	5.46695
2350	ISOPRENE	LL	-2.8398	1.38474	6	0.215396	10.3612	7.11844
2360	ISOPROPANOL	LL	-1.9189	1.21872	6	0.166719	13.4625	7.20498
2370	ISOPROPYL ACETATE	LL	-.80703	1.12898	6	.0896555	12.0222	7.11716
2390	ISOPROPYL CHLORIDE	LL	-1.6028	1.22527	8	0.127767	14.9689	7.52885
-	ISOVALERALDEHYDE	LL	-2.7791	1.36676	6	0.102188	11.1909	7.14904
2450	MESITYL OXIDE	LL	-2.5944	1.26898	6	0.10352	12.9133	7.1985
-	METHACROLEIN	LL	-2.8695	1.28287	6	0.233299	12.6663	7.72282
2460	METHACRYLIC ACID	HL	-6.6118	1.74781	6	0.366906	1.37953	6.10761
2500	METHANOL	LL	-2.3981	1.06519	48	0.345716	185.666	7.35637
1930	METHOXY-ETHANOL,2-	LL	-3.127	1.22972	6	0.181911	13.4296	7.2025
2510	METHYL ACETATE	LL	-1.1087	1.0562	6	.0881283	12.9204	7.26467
-	METHYL ACETYLENE	G	-1.8489	1.26873	6	.0333733	3.13703	7.8821
2560	METHYL CHLORIDE	G	-5.5539	1.54125	6	0.124856	3.89091	8.[illegible]381
2640	METHYL ETHYL KETONE	LL	-1.8876	1.26262	9	0.243063	25.2199	6.54915
2645	METHYL FORMATE	LL	-2.1378	1.09632	6	0.123123	16.9883	7.23917
2665	METHYL METHACRYLATE	LL	-1.8063	1.19693	6	.0609566	12.9869	7.19995
2650	METHYL-2-PENTANOL,4-	LL	-0.916	1.03982	8	0.196403	15.6961	7.57994
2660	METHYL-2-PENTANONE,4-	LL	-1.3252	1.22039	6	0.135332	10.2416	7.05588
-	METHYL-2,4-PENTANEDIOL,2-	LL	-.20173	.524322	6	0.17221	13.1088	7.288

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 5-169 (continued)

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-OVA

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSX	XBAR
2550	METHYL-3-BUTYN-2-OL,2	LL	-1.8974	1.27675	6	0.232082	10.1905	7.05895
-	METHYLAL	LL	-2.2406	1.19782	12	0.281975	52.6838	6.41101
2540	METHYLANILINE,N-	HL	-.71359	.923574	6	.0227449	3.11941	6.24884
2570	METHYLCYCLOHEXANE	LL	-2.3663	1.34952	6	0.494885	7.87591	6.87425
-	METHYLCYCLOHEXENE,1-	LL	-2.1159	1.34919	6	0.153802	8.95789	6.98327
2670	METHYLPENTYNOL	LL	-.06858	.985905	6	0.289271	12.5573	7.19601
2690	METHYLSTYRENE, A-	LL	-1.2874	.884034	14	0.240239	66.6129	6.69408
1660	MONOETHANOLAMINE	LL	-2.4791	.855164	10	0.979098	22.2589	6.38433
2700	MORPHOLINE	LL	-0.9405	1.10892	6	0.215556	13.3896	7.18013
2770	NITROBENZENE	HL	3.37879	.255857	5	0.403458	3.7675	5.51561
2790	NITROETHANE	LL	-.38829	1.00525	6	.0769128	14.102	7.17721
2791	NITROMETHANE	LL	-.77951	.954076	6	.0563271	13.5221	7.27112
2795	NITROPROPANE	LL	-1.043	1.10518	6	0.179594	13.5435	7.26298
-	NONANE-N	LL	-1.5826	1.10603	14	0.501526	41.1309	6.3957
-	OCTANE	LL	-1.9407	1.20639	6	.0908505	11.4258	7.14769
2851	PENTANE	LL	-2.059	1.31598	6	0.165283	9.68585	7.05094
2910	PHENOL	S	.710164	.654066	10	0.155352	7.92326	5.72457
-	PHENYL-2-PROPANOL,2-	LL	1.00078	.402044	6	0.151805	13.1932	7.2875
2973	PICOLINE,2-	LL	-1.7278	1.30562	6	0.100047	8.91213	7.02075
-	PROPANE	G	0.76145	.882834	10	0.949772	3.20321	7.48077
3063	PROPIONALDEHYDE	LL	-2.8873	1.29443	6	.0929661	12.9242	7.24108
3066	PROPIONIC ACID	LL	-1.4915	1.12963	6	.0994827	7.43093	6.89446
3070	PROPYL ALCOHOL	LL	-2.4137	1.27078	6	0.142748	14.0456	7.22723
-	PROPYLBENZENE,N-	LL	-1.2593	1.22527	6	.0785943	7.78882	6.93443
3090	PROPYLENE	G	.864818	.926563	6	0.321062	4.94104	7.47693
3120	PROPYLENE OXIDE	LL	-1.5249	1.1886	7	0.103767	13.6953	7.43403
3130	PYRIDINE	LL	-.59723	1.16018	6	.0990446	8.47388	6.97017
3230	STYRENE	LL	-1.3382	.990213	6	.0751161	13.777	7.23935
3290	TETRACHLOROETHANE,1,1,1,2	LL	1.50932	.697932	10	0.589679	17.5221	6.82511
3291	TETRACHLOROETHANE,1,1,2,2	LL	-.63198	.872029	8	0.137087	12.074	6.91454
3349	TETRACHLOROETHYLENE	LL	-2.0129	1.05606	26	0.831676	113.842	6.77884

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 5-169 (continued)

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-OVA

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSX	XBAR
3349	TOLUENE	LL	-.55953	1.18126	6	.0633951	8.59474	6.89291
3393	TRICHLOROBENZENE,1,2,4-	HL	-.17734	.982448	3	0.265473	1.23926	6.19842
3395	TRICHLOROETHANE,1,1,1-	LL	-.58382	1.08916	6	.0701193	12.7084	7.19098
3400	TRICHLOROETHANE,1,1,2-	LL	-.78558	1.05963	6	.0916246	12.8405	7.20739
3410	TRICHLOROETHYLENE	LL	-1.6403	1.18484	6	.0879318	13.453	7.21675
3420	TRICHLOROPROPANE,1,2,3-	LL	-2.9814	1.32332	6	0.31741	7.54119	7.53407
3450	TRIETHYLAMINE	LL	-.68947	1.15664	6	0.17419	9.19563	6.95765
3510	VINYL ACETATE	LL	-1.4414	1.12549	6	0.178741	13.2953	7.23837
3520	VINYL CHLORIDE	G	-12.813	2.43718	3	.0838916	2.44541	8.00167
-	VINYL PROPIONATE	LL	-0.9365	1.10343	3	0.286336	6.59355	7.29263
3530	VINYLIDENE CHLORIDE	LL	-2.3696	1.24041	6	0.172576	11.489	7.34056
3570	XYLENE, P-	LL	-1.6901	1.09082	18	0.264759	76.5381	6.73317
3550	XYLENE,M-	LL	-1.758	1.32044	6	0.084293	7.86889	6.8857
3560	XYLENE,O-	LL	-1.2606	1.24282	6	0.340035	7.74549	6.8848

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 5-170

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-TLV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSX	XBAR
70	ACETIC ACID	LL	1.53532	.633431	20	0.446849	81.6063	6.75306
80	ACETIC ANHYDRIDE	LL	2.64396	.596488	3	0.149324	4.37929	6.97689
90	ACETONE	LL	-.22007	.991616	14	0.452099	56.4432	6.73273
100	ACETONE CYANOHYDRIN	HL	.900022	0.67604	6	0.222799	1.07377	5.97147
110	ACETONITRILE	LL	.206418	.959987	6	0.113292	12.5475	7.23366
120	ACETOPHENONE	HL	1.57858	.384909	14	0.40411	62.071	6.71836
125	ACETYL CHLORIDE	LL	-.53649	0.95225	6	0.221368	14.6944	7.21322
-	ACETYL-1-PROPANOL,3-	LL	1.85273	.426187	12	0.60199	50.5077	6.46174
130	ACETYLENE	G	2.77721	.428709	5	.0808672	4.9029	8.1201
160	ACRYLIC ACID	LL	3.0261	.207029	6	1.15552	11.9679	7.31447
170	ACRYLONITRILE	LL	1.08345	0.70882	6	1.10159	14.1474	7.2202
-	ALLENE	G	1.48948	.647644	4	.0420136	4.48003	8.31859
250	AMYL ALCOHOL,N-	HL	1.69081	.753762	3	.0770913	2.69979	6.68114
2855	AMYLENE	LL	-2.7517	1.27023	9	0.679982	15.1755	7.62642
330	ANISOLE	LL	1.5387	0.72482	3	0.1171	4.32343	6.92252
360	BENZALDEHYDE	HL	2.73967	.502696	3	.0123884	1.77778	6.34483
380	BENZENE	LL	0.28303	.960989	28	0.128504	55.3541	6.61165
450	BENZONITRILE	HL	3.30419	.397316	6	0.263045	3.09142	6.08178
490	BENZOYL CHLORIDE	HL	2.87184	0.48077	3	0.213308	6.62934	7.18737
530	BENZYL CHLORIDE	HL	3.46699	.438342	6	0.495549	10.7415	8.00839
570	BROMOBENZENE	LL	1.40637	.830522	3	0.12348	3.86463	6.8984
590	BUTADIENE,1,3-	G	.498448	.751221	4	.0321868	4.16748	8.22042
-	BUTANE,N-	G	1.74095	.852814	7	.0692898	3.32684	8.337
640	BUTANOL,N	LL	1.36408	.738053	3	0.188523	6.0393	7.04506
650	BUTANOL,SEC-	LL	-.32886	1.00927	8	0.180589	15.8209	7.59599
660	BUTANOL,TERT	S	-.90524	1.01084	5	0.202464	8.24512	7.75919
592	BUTENE,1-	G	2.4338	.617307	5	.0537661	4.64345	8.27484
600	BUTYL ACETATE,	LL	1.47233	.811784	4	.0440696	8.27958	7.62533
630	BUTYL ACRYLATE,N-	LL	1.69695	.738919	3	0.222439	4.95025	7.02981
-	BUTYL ETHER,N	LL	.973474	0.78565	3	0.218728	6.2084	7.50326

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 5-170 (continued)

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-TLV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSX	XBAR
-	BUTYL ETHER,SEC	LL	.854386	.890522	6	0.242698	8.93521	7.78741
670	BUTYLAMINE,N-	LL	.058361	.921838	4	0.155349	8.07529	7.59075
680	BUTYLAMINE,SEC-	LL	.364395	.916162	3	.0543876	6.13498	7.15
690	BUTYLAMINE,TERT-	LL	.514191	.880031	4	0.076921	8.00765	7.63305
-	BUTYLBENZENE,TERT-	HL	2.31474	.515112	6	0.763323	13.8471	7.21205
750	BUTYRALDEHYDE N-	LL	1.53293	0.76441	3	.0547613	6.1678	7.29208
760	BUTYRIC ACID	HL	1.90498	.627895	3	.0415519	.473413	5.84132
780	BUTYRONITRILE	LL	.400785	.919176	3	0.345687	5.88803	7.22597
790	CARBON DISULFIDE	LL	.809447	.794289	3	0.038928	6.41512	7.22315
810	CARBON TETRACHLORIDE	LL	4.65946	.093298	6	0.738964	13.7915	7.20605
830	CHLOROACETALDEHYDE	LL	-1.6493	1.00029	8	0.21254	12.6252	7.1765
890	CHLOROBENZENE	LL	.337457	.976794	11	0.116228	20.2555	7.35836
1740	CHLORDETHANE	G	2.43057	.548012	8	1.38856	40.5528	6.09409
930	CHLOROFORM	LL	1.1337	.637191	6	0.267978	13.3425	7.26212
960	CHLOROPHENOL,O-	HL	1.99922	.589287	3	0.167483	2.75324	6.66217
-	CHLOROPROPENE, 1-	LL	-1.2944	1.15423	8	0.239914	16.3457	7.58835
210	CHLOROPROPENE, 3-	LL	-.29344	1.00783	12	0.123718	52.1424	6.45557
970	CHLOROTOLUENE,M-	LL	.974584	.902659	3	.0661162	3.87222	6.9301
980	CHLOROTOLUENE,O-	LL	1.12209	.871937	3	.0965194	3.87205	6.88833
990	CHLOROTOLUENE,P-	LL	.643704	.914041	3	0.149187	3.85394	6.93231
1010	CRESOL,O-	S	2.24855	.598375	3	0.373867	1.48995	6.30801
1040	CROTONALDEHYDE	LL	2.10615	0.49768	8	0.866604	12.9835	7.24563
1060	CUMENE	LL	.372112	.653917	12	0.762507	51.1558	6.46426
1120	CYCLOHEXANE	LL	1.02342	.924071	10	0.119838	15.7682	7.68236
1130	CYCLOHEXANOL	HL	3.00453	0.49349	6	0.363684	3.57046	6.28751
1140	CYCLOHEXANONE	LL	1.20283	.709531	6	0.419218	10.3795	7.06142
1150	CYCLOHEXENE	LL	1.36081	.785839	6	.0734484	9.15524	7.81843
1160	CYCLOHEXYLAMINE	LL	-.39214	1.00749	5	.0315026	8.99739	7.81516
-	DECANE	HL	-3.6251	1.55525	6	0.484709	.701072	5.67254
1190	DIACETONE ALCOHOL	HL	-2.3153	1.24765	6	0.324757	3.44138	6.4446
-	DIACETYL	LL	0.13275	.869795	12	0.259957	49.1017	6.60012

* ORGANIC CHEMICAL PRODUCERS DATA BASE

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 5-170 (continued)

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-TLV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSX	XBAR
-	DICHLORO-1-PROPANOL,2,3-	LL	2.70208	.319956	6	0.222292	13.6007	7.23629
1270	DICHLORO-1-PROPENE,2,3-	LL	.779298	.861583	5	0.169488	9.26572	7.79473
-	DICHLORO-2-PROPANOL,1,3-	LL	.358175	.639059	8	0.286746	15.4488	7.55474
1215	DICHLOROBENZENE,M-	HL	1.75138	.740694	3	.0598515	2.74315	6.59837
1216	DICHLOROBENZENE,O-	HL	1.02702	.866847	3	.0570792	1.59908	6.33962
-	DICHLOROETHANE,1,1-	LL	-.15658	.952456	8	0.105846	15.7135	7.57506
1244	DICHLOROETHANE,1,2-	LL	-.34562	.957124	8	0.116586	14.1446	7.2661
1235	DICHLOROLTHYLENE,CIS1,2-	LL	-3.9143	1.33988	8	0.500384	15.325	7.54257
1236	DICHLOROETHYLENE,TRANS1,2	LL	-2.9985	1.22745	8	0.752501	13.1057	7.02025
2620	DICHLOROMETHANE	LL	-.89162	.955286	6	0.173045	13.1072	7.23499
3110	DICHLOROPROPANE,1,2-	LL	-2.2472	1.17229	8	0.380407	15.8547	7.58337
1440	DIISOBUTYLENE	LL	-.09895	.969107	10	0.318329	15.3066	7.62355
-	DIISOPROPYL BENZENE,1,3-	LL	2.06897	.387379	6	0.843952	28.5675	6.27642
1870	DIMETHOXY ETHANE,1,2-	LL	1.0292	.849491	3	.0667093	6.60878	7.19222
1490	DIMETHYLFORMAMIDE,N,N-	LL	2.15791	.648372	3	.0077422	4.59798	7.02873
1495	DIMETHYLHYDRAZINE 1,1-	LL	-1.1679	1.01568	3	0.17593	6.59834	7.26392
-	DIMETHYLSTYRENE,2,4-	LL	1.84209	.316572	6	0.435465	13.6858	7.28067
1520	DIMETHYLSULFOXIDE	HL	1.19045	.698461	3	0.049848	.204941	5.66978
1480	DIOXANE	LL	1.90645	.770596	3	.0435575	6.5131	7.20306
1650	EPICHLOROHYDRIN	LL	-.63762	.992733	6	.0562992	13.356	7.22066
-	ETHANE	G	1.67058	.849183	3	0.28197	1.15981	7.84885
1910	ETHOXY ETHANOL,2-	LL	1.38151	.798001	3	.0354359	4.87638	7.00472
1670	ETHYL ACETATE	LL	.671462	.887545	18	0.309859	66.2747	6.71408
1680	ETHYL ACETOACETATE	HL	1.96467	0.66266	3	.0202922	1.7722	6.29103
1750	ETHYL CHLOROACETATE	LL	1.10037	.837749	3	0.108622	4.42863	6.99629
1990	ETHYL ETHER	LL	1.60083	.814314	4	.0494937	8.56318	7.59965
1710	ETHYLBENZENE	LL	.665875	.735578	19	1.11767	68.9211	6.97741
1770	ETHYLENE	G	.594303	.891134	6	0.145849	6.26961	8.8141
1980	ETHYLENE OXIDE	G	-1.0089	1.01284	3	.0811012	2.39808	8.11482
1800	ETHYLENEDIAMINE	LL	1.26645	.764087	3	.0956445	6.24219	7.23272
2060	FORMIC ACID	LL	-.27968	.641373	6	0.39944	12.0961	7.24228

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 5-170 (continued)

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-TLV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSx	XBAR
1221	FREON 12	G	.067945	.702149	6	0.639168	7.09205	7.51936
2073	FURFURAL	HL	2.48411	.480107	3	.0094205	6.34988	7.21469
2105	GLYCIDOL	LL	-1.2608	.954506	6	0.221402	4.78354	6.66621
-	HEPTANE	LL	.990665	0.92378	3	.0713575	3.74967	6.98098
-	HEXANE,N-	LL	1.36541	.886527	26	0.126527	35.4753	7.23407
-	HEXENE,1-	LL	1.17156	0.6936	10	1.07612	15.3057	7.65326
-	HYDROXYACETONE	LL	-.64006	.821067	8	0.326534	15.5756	7.59178
-	ISOBUTANE	G	2.21202	.809978	7	0.436544	4.02085	8.25287
2200	ISOBUTYLENE	G	2.47459	.502984	6	0.71852	2.43034	5.46695
2360	ISOPROPANOL	LL	.450358	.916636	6	0.192117	13.4625	7.20498
2370	ISOPROPYL ACETATE	LL	1.49877	.813083	4	.0570508	8.54523	7.5767
2390	ISOPROPYL CHLORIDE	LL	-.24062	1.02655	8	0.148871	14.9689	7.52885
-	ISOVALERALDEHYDE	LL	.012977	.910504	8	0.438335	16.1261	7.60251
2450	MESITYL OXIDE	LL	-1.1452	.993585	6	0.363946	12.9133	7.1985
-	METHACROLEIN	LL	-.47037	.905636	8	0.643145	18.2865	8.20673
2460	METHACRYLIC ACID	HL	-.69002	0.85944	6	0.438606	1.37953	6.10761
2500	METHANOL	[illegible]	.18 625	.906937	32	0.296364	119.802	7.24719
1930	METHOXY-ETHANOL,2-		2.07507	.689261	3	.0552239	6.7[illegible]18	7.2025
2510	METHYL ACETATE	LL	.[illegible]3303	.919727	6	0.109923	12.9204	7.26467
-	METHYL ACETYLENE	G	1.2[illegible]62	.714083	5	.0537374	3.42491	8.3449
2560	METHYL CHLORIDE	-	-5.2929	1.47615	3	0.143325	1.94546	8.21631
2640	METHYL ETHYL KETONE	[illegible]	-.26525	1.01477	11	0.178905	35.5776	7.00659
2645	METHYL FORMATE	LL	-.54896	.988267	6	.0582411	16.9883	7.23917
2665	METHYL METHACRYLATE	LL	-.61443	.970127	6	0.252803	12.9869	7.19995
2650	METHYL-2-PENTANOL,4-	LL	-.32448	.960325	8	0.227184	15.6961	7.57994
2660	METHYL-2-PENTANONE,4-	LL	0.64249	.880799	10	0.222826	18.0426	7.77479
-	METHYL-2,4-PENTANEDIOL,2-	LL	1.40603	.383098	6	0.373948	13.1088	7.288
-	METHYLAL	LL	.426532	.915145	12	0.131833	52.6838	6.41101
2540	METHYLANILINE,N-	HL	1.45363	.659612	3	0.214953	1.55971	6.24884
2570	METHYLCYCLOHEXANE	LL	.270354	.986468	10	0.209975	16.6993	7.63536
-	METHYLCYCLOHEXENE,1-	LL	1.20211	.779284	10	0.253704	17.4672	7.72897

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 5-170 (continued)

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-TLV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSX	XBAR
2670	METHYLPENTYNOL	LL	.378822	.843633	6	0.224115	12.5573	7.19601
2690	METHYLSTYRENE, A-	LL	1.5176	.428728	14	0.768371	66.6129	6.69408
1660	MONOETHANOLAMINE	LL	3.77579	.231518	5	0.317533	11.1294	6.38433
2700	MORPHOLINE	LL	.417395	.867233	3	0.543624	6.69482	7.18013
2770	NITROBENZENE	HL	5.86537	-.04625	4	0.364955	2.79181	5.73648
2790	NITROETHANE	LL	1.30098	.753164	6	0.278354	14.102	7.17721
2791	NITROMETHANE	LL	-.09862	.817192	6	0.498902	13.5221	7.27112
2795	NITROPROPANE	LL	1.14653	.810834	6	0.22734	13.5435	7.26298
-	NONANE-N	LL	.745275	.712676	14	0.614029	41.1309	6.3957
-	OCTANE	LL	-.54983	.979727	6	.0939152	11.4258	7.14769
2851	PENTANE	LL	.069793	1.04455	8	.0904502	15.1917	7.52991
2910	PHENOL	S	2.83764	.418267	5	0.261277	3.96163	5.72457
-	PHENYL-2-PROPANOL,2-	LL	2.79853	0.22002	6	0.306155	13.1932	7.2875
2973	PICOLINE,2-	LL	.044869	.977725	5	.0380285	8.34831	7.73468
-	PROPANE	G	1.40707	.875637	7	0.632665	5.85865	7.95726
3063	PROPIONALDEHYDE	LL	.034692	.938077	7	0.260854	15.4002	7.48396
3066	PROPIONIC ACID	LL	.705684	.772068	5	0.526247	7.1852	6.80396
3070	PROPYL ALCOHOL	LL	1.48397	.791088	3	.0321125	7.0228	7.22723
-	PROPYLBENZENE,N-	LL	2.15539	.480363	6	1.29885	7.78882	6.93443
3090	PROPYLENE	G	3.54911	.466641	8	0.815257	8.85238	7.88063
3120	PROPYLENE OXIDE	LL	-.10224	.989086	7	0.366882	14.1261	7.45571
3130	PYRIDINE	LL	-.24347	1.00886	12	0.130339	18.0116	7.85092
3230	STYRENE	LL	1.92813	.346454	6	0.984542	13.777	7.23935
3290	TETRACHLOROETHANE,1,1,1,2	LL	-1.6641	.969855	10	0.367616	17.5221	6.82611
3291	TETRACHLOROETHANE,1,1,2,2	LL	-1.0205	0.81849	8	0.293543	12.074	6.91454
2860	TETRACHLOROETHYLENE	LL	0.31901	.688569	26	0.469724	113.842	6.77884
3349	TOLUENE	LL	.120702	.851475	9	0.901616	16.2675	7.5501
3393	TRICHLOROBENZENE,1,2,4-	HL	-1.3223	1.24323	3	0.1571	1.23926	6.19842
3395	TRICHLOROETHANE,1,1,1-	LL	-.92319	1.00391	6	0 120871	12.7084	7.19098
3400	TRICHLOROETHANE,1,1,2-	LL	-1.2924	0.99825	6	0.1101	12.8405	7.20735
3410	TRICHLOROETHYLENE	LL	-.14259	.883197	6	0.134591	13.453	7.21675

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

TABLE 5-170 (continued)

STATISTICS FOR COMPUTING ESTIMATES AND CONFIDENCE INTERVALS

TYPE-TLV

OCPDB* ID NO	COMPOUND NAME	VOLATILITY CLASS**	A	B	N	SE	SSX	XBAR
3420	TRICHLOROPROPANE,1,2,3-	LL	-2.3703	1.16714	6	0.233901	7.54119	7.53407
3450	TRIETHYLAMINE	LL	.797863	.874591	5	0.180692	8.96445	7.71796
3510	VINYL ACETATE	LL	0.47409	.779072	6	0.593492	13.2953	7.23837
3520	VINYL CHLORIDE	G	-7.0574	1.75493	3	0.110247	2.44541	8.00167
-	VINYL PROPIONATE	LL	-11.761	2.24221	3	1.16066	6.59355	7.29263
3530	VINYLIDENE CHLORIDE	LL	-.75599	.987246	6	0.117839	11.489	7.34056
3570	XYLENE, P-	LL	-.13472	.813054	17	0.597877	70.8015	6.59625
3550	XYLENE,M-	LL	.644007	.716846	10	1.17881	15.9403	7.60576
3560	XYLENE,O-	LL	-.54235	1.01815	4	0.266544	6.46294	7.3494

* ORGANIC CHEMICAL PRODUCERS DATA BASE.

** G = GAS; LL = LIGHT LIQUID; HL = HEAVY LIQUID.

SECTION 6

REFERENCES

(1) Environmental Protection Agency, VOC Fugitive Emissions in Synthetic Organic Chemicals Manufacturing Industry - Background Information for Proposed Standards, Emission Standards and Engineering Division, Research Triangle Park, North Carolina, March 1980.

(2) Operating Manual - OVA-108, Analabs, Foxboro Analytical, North Haven, CT, 06473.

(3) Operating Manual - TLV Sniffer, J. W. Bacharach Instrument Company, Division of Ambac Industries, Santa Clara, CA, 95050.

(4) Delaney, B. T. Operation and Use of Portable Organic Vapor Analyzer, Exxon Research and Engineering, February 24, 1978.

(5) Weast, R. C., ed. CRC Handbook of Chemistry and Physics, 48th Edition. The Chemical Rubber Co., Cleveland, Ohio, 1968, pp. D-57.

(6) Mood, Graybill, and Boes, Introduction to the Theory of Statistics, Third Ed., McGraw-Hill, New York, N.Y., 1974, pp. 181.

(7) N. R. Draper and H. Smith, Applied Regression Analysis, John Wiley & Sons, Inc., New York, 1968, pp. 407.

(8) Dale M. Heien, "A Note on Log-Linear Regression," Journal of the American Statistical Association," 63, 1968, pp. 1034-1038.